

# MARINE REVIEW.

VOL. XIV.

CLEVELAND, O., OCTOBER 22, 1896.

No. 17.

## Gas Buoys in High Favor.

Since the gas buoys have been established by the Canadian government in Pelee passage, Lake Erie, vessel masters have written numerous letters commending their usefulness, and it is the unanimous opinion of captains engaged in the Escanaba ore trade that similar lights are badly needed in Poverty passage and on Lansing shoal, north of Squaw island, Lake Michigan. The accident to the steel steamer Roman in Poverty passage, a few days ago, involving repairs amounting to about \$10,000, which are now being made to the boat in Cleveland, is the strongest kind of an argument in favor of buoys of this kind at the points named on Lake Michigan. In the protest pertaining to the accident to the Roman, Capt. A. J. Greenley of that steamer says:

"When we left Escanaba (12:25 a. m.), it was blowing hard from the south. It was very dark as we approached Poverty passage, so that we could not see Poverty island but did see the light. As we were making the passage, we had the light bearing as usual, and so far as we could determine, the master and mate both being on deck, the master on the pilot house in charge, we were about to pass to the southward of the northermost shoal, on which there is a red can. We could not see the can owing to the darkness. The steamers Corsica and Harvey H. Brown were following a short distance astern of us, making almost the same course that we were, coming right astern of us. There was a heavy sea. Just as we were hauling out S. E., believing ourselves to be clear of the shoals, our vessel settled in the seaway and she struck pretty hard under the forward compartment. We stopped our engine and blew a danger signal to the steamers astern and put our helm aport, hauling out to the southward. We did not strike any more and the steamers astern put their helms over and managed to clear the shoal. Both forward compartments filled, but finding that the leak would have no further effect we proceeded on our voyage as far as Port Huron, where we had to lighten 190 tons of ore before going through the rivers, as the steamer was drawing 18½ feet of water forward. We made what we considered reasonable and sufficient allowance for leeway on account of the southerly wind and sea and can not account for our striking in Poverty passage, except there may have been a trifle more leeway than we allowed on any of the steamers, or the current may have set us over to the northward a little. The passage is narrow and there is nothing to mark the shoals on either side that can be seen on a dark night and the light on Poverty island by which, under such circumstances, we must regulate our course, is about three miles distant with no visible object by which to take a range."

For two or three years past the Lake Carriers' Association has urged the light-house board to place gas buoys at Gravelly island in Poverty passage, and at Lansing shoal. In his latest communication to the board on the subject of aids to navigation, Mr. C. H. Keep, secretary of the association, says: "Gravelly island and Lansing shoal are two of the points where the light-house board by vote determined more than a year ago to place gas buoys. For some reason unknown to us the buoys have not been placed and these important points remain still unlighted. The entire commerce to and from Gladstone and Escanaba passes between the two shoals near Gravelly island, and the most of it, on its way up and down the lakes, passes north of Squaw island, Lake Michigan, and is subject to the dangers of Lansing shoal. We believe that gas buoys would be eminently satisfactory lights at these points, and would be most economical lights for the government. Nevertheless we have no particular wish in the matter, save that the localities should be lighted."

The new buoys in Pelee passage, Lake Erie, are causing vessel masters to take a general interest in aids to navigation. "I have passed through Pelee passage twice at night since the gas buoys were established there," says Capt. C. Petersen of the steamer J. J. McWilliams, "and I must say they are a great benefit and relieve us of a great deal of anxiety. On Oct. 11, coming from the eastward, the night was dark, but the atmosphere clear, and I saw the light of the buoy on southeast shoal at least eight miles from an elevation of 35

feet. When part of the new channel at Sailors' Encampment, Sault river, is fully opened, I think it would be a good plan for the Lake Carriers' Association to see that a few stakes of a kind that can be seen are placed there, as we do not feel like paying \$10 to a tug every time we pass through the cut."

Capt. John Coulter of the steamer Yale says: "The gas buoys on Southeast shoal and the middle ground, Pelee passage, are certainly the best of the late aids to navigation. Poverty passage and Lansing shoal on Lake Michigan are the next points at which gas buoys are most needed."

Capt. R. C. Jackson, steamer John Mitchell: "In going down Lake Erie on my last trip, the night was very dark but I saw the Pelee buoys at a distance of full six miles. On the return trip I put my boat on the course W. by S. at Erie peninsula and brought up within a half mile of the can; got the can to bear N. N. W.; hauled around N. W., and ran fully ten minutes before I saw the light-house. It was very smoky and had it not been for the buoy I would have lost considerable time in finding the light-house."

Capt. F. D. Galton, steamer W. H. Gratwick No. 1: "The gas buoys in Pelee passage are great aids to navigation, especially the one on Southeast shoal. The lights can be seen at a distance of six to seven miles in clear weather. They were badly needed and now that they are in operation they are fully appreciated."

Capt. W. B. Nelson: "Under favorable atmospheric conditions I saw the Pelee buoys at a distance of seven miles. They are great aids to navigation."

## His Work is Done.

W. L. McCormick, editor of the Marine Record, died at his home in Cleveland, Friday, after an illness of only three weeks. Death was due to an abscess of the brain, brought on by over-work. He leaves a wife and two young children.

"The keynote of Mr. McCormick's character," says a resolution adopted by the Cleveland Press Club, "seems to his associates to have been his absolute conscientiousness; in all that he undertook he constantly kept in view the best interests of his employers, the nobility of his profession and the rights of those with whom his pencil had to deal." This is certainly a true statement of Mr. McCormick's character, and there are many other young men like him on daily newspapers throughout the country. His training was on two of the leading daily papers of Cleveland. He was among the untiring and faithful workers in that branch of the profession who might apply the same energy to almost any other line and be far better paid for their labor. In many cases the fascinations of newspaper work tend to hold men to it. In the short time that he had been on the Record, ambition prompted Mr. McCormick to give up fourteen hours or more to labor each day as he had been doing on the daily papers.

A big steel steamer, the John Englis, built by the Maine Steamship Co. for freight and passenger service between New York and Portland, will be launched to-day (Thursday) at Roach's ship yard, Chester, Pa. This steamer will have 126 state rooms for passengers and will have a freight capacity of about 2,000 tons. It is expected that she will make 18½ miles an hour in regular service. She is 313 feet long and 46 feet beam. Her triple expansion engine, with cylinders 30, 48 and 75 inches in diameter, and 56 inches stroke, will be driven by six forty-ton boilers, carrying a pressure of 180 pounds of steam to the square inch, and the horse power to be developed will be in excess of 4,000. Boilers are fitted with eighteen Purves ribbed steel furnace flues of 40 inches inside diameter by 8 feet 11 inches long by 9-16 inch thick, to stand a working pressure of 190 pounds per square inch.

About Oct. 31, the fourth order light at Mendota light station at the entrance to Lac la Belle, Bete Grise bay, south side of the outer end of Keweenaw peninsula, now showing fixed white varied by a white flash every forty-five seconds, will be changed to show fixed white.



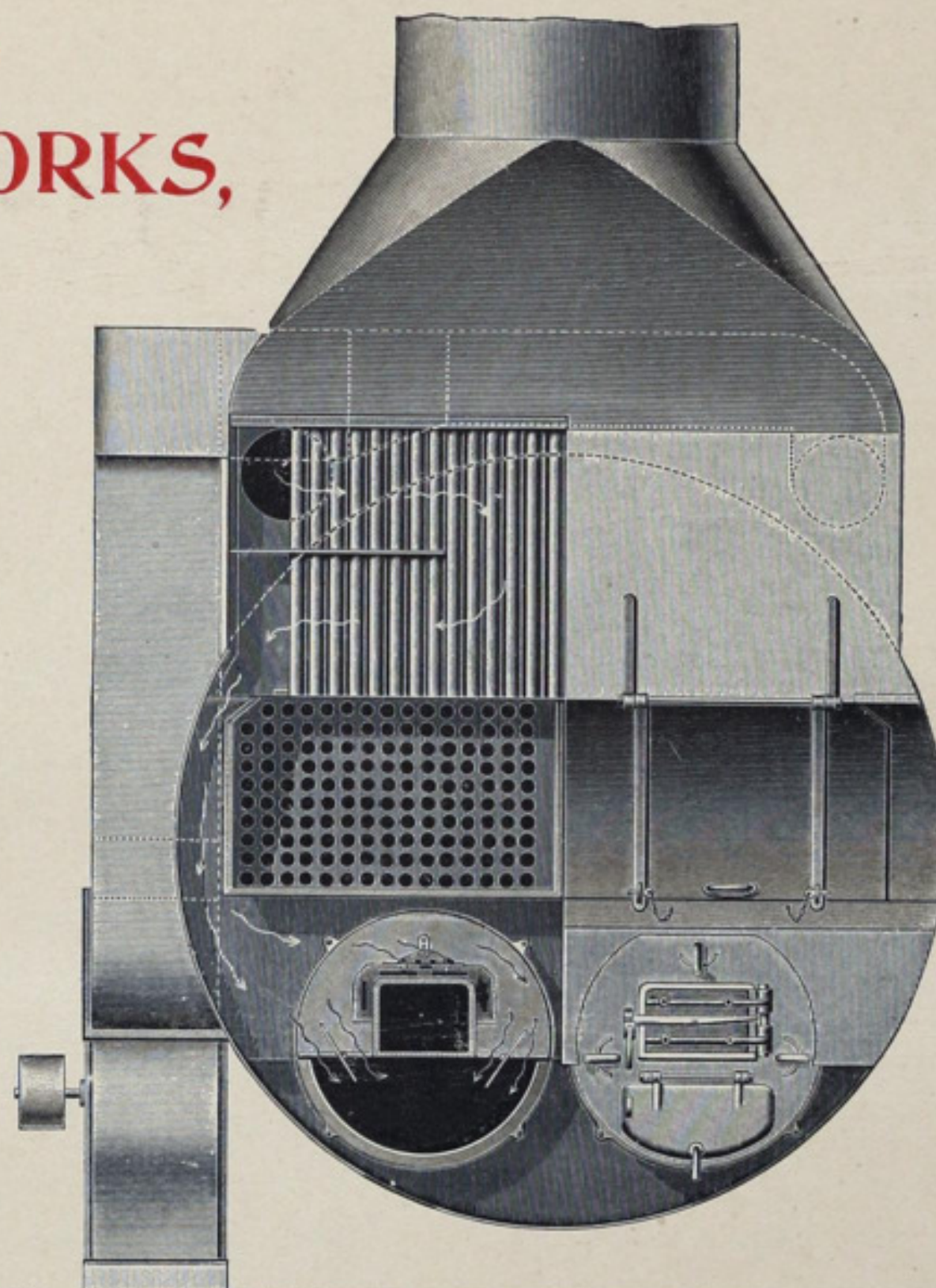
# HOWDEN HOT DRAFT SYSTEM . . . .

As Applied to Marine Boilers by the  
**DRY DOCK ENGINE WORKS,**  
 DETROIT, MICHIGAN.

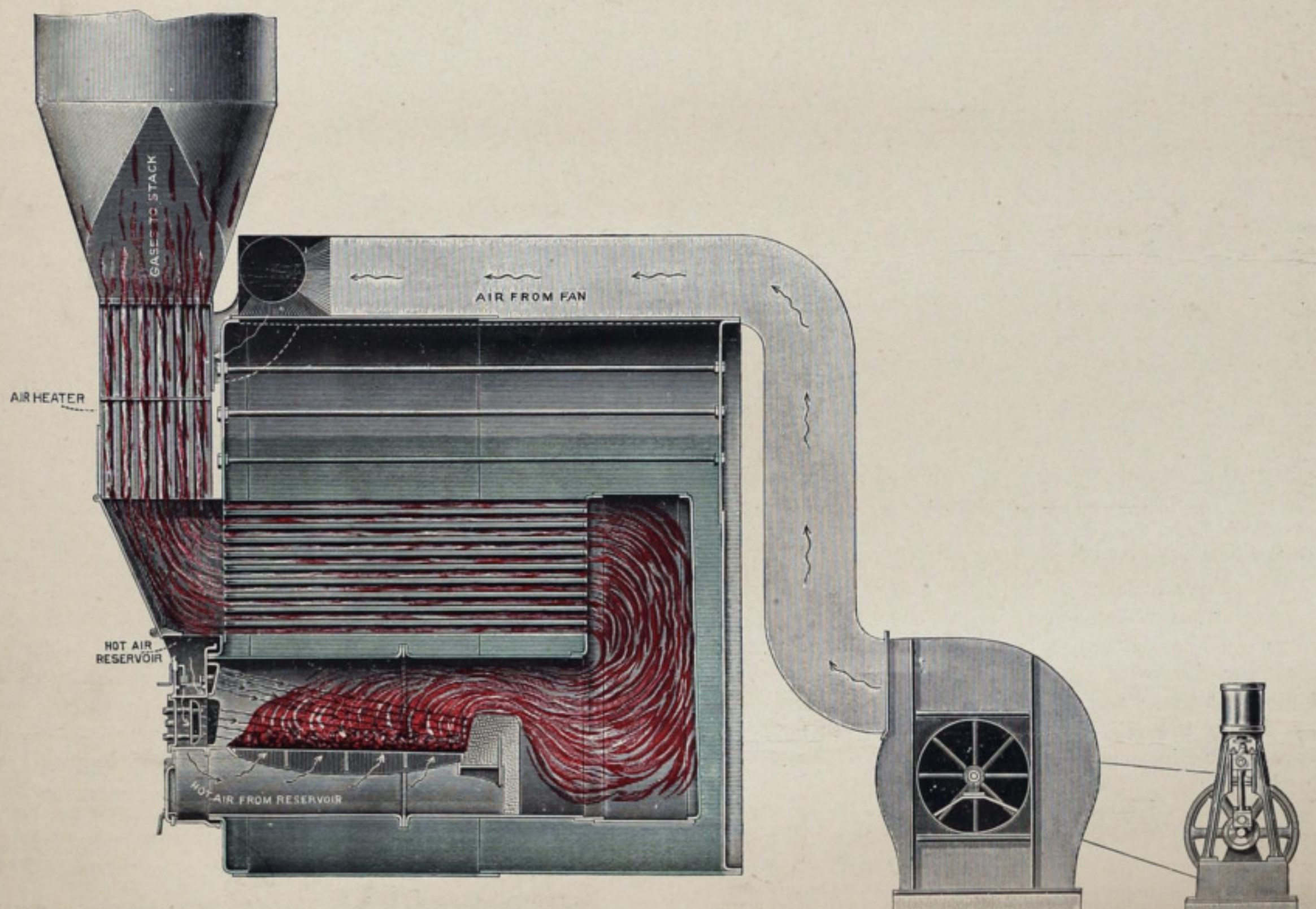
The following lake steamers, aggregating 45,000 horse power, have been equipped with the Howden system by the Dry Dock Engine Works, Detroit, Mich.:

Virginia,	Pioneer,	Chicora,
Harvey H. Brown,	W. P. Ketcham,	Madagascar,
Nicaragua,	Argo,	Schoolcraft,
Rappahannock,	Sacramento,	Penobscot,
Mohawk,	Mohegan,	Progress,
S. R. Kirby,	R. P. Ranney,	A. McVittie,
Marguerite,	Iron Age,	Pleasure,
Arrow,	City of Buffalo,	City of Alpena,
City of Mackinaw,	Senator,	Aragon,
Robert Fulton,	Sir Wm Fairbairn,	Colonial
Appomattox,	New Davidson steamers Nos. 76 and 77.	

The Howden system has a total installation in all parts of the world of 1,212,800 horse power.

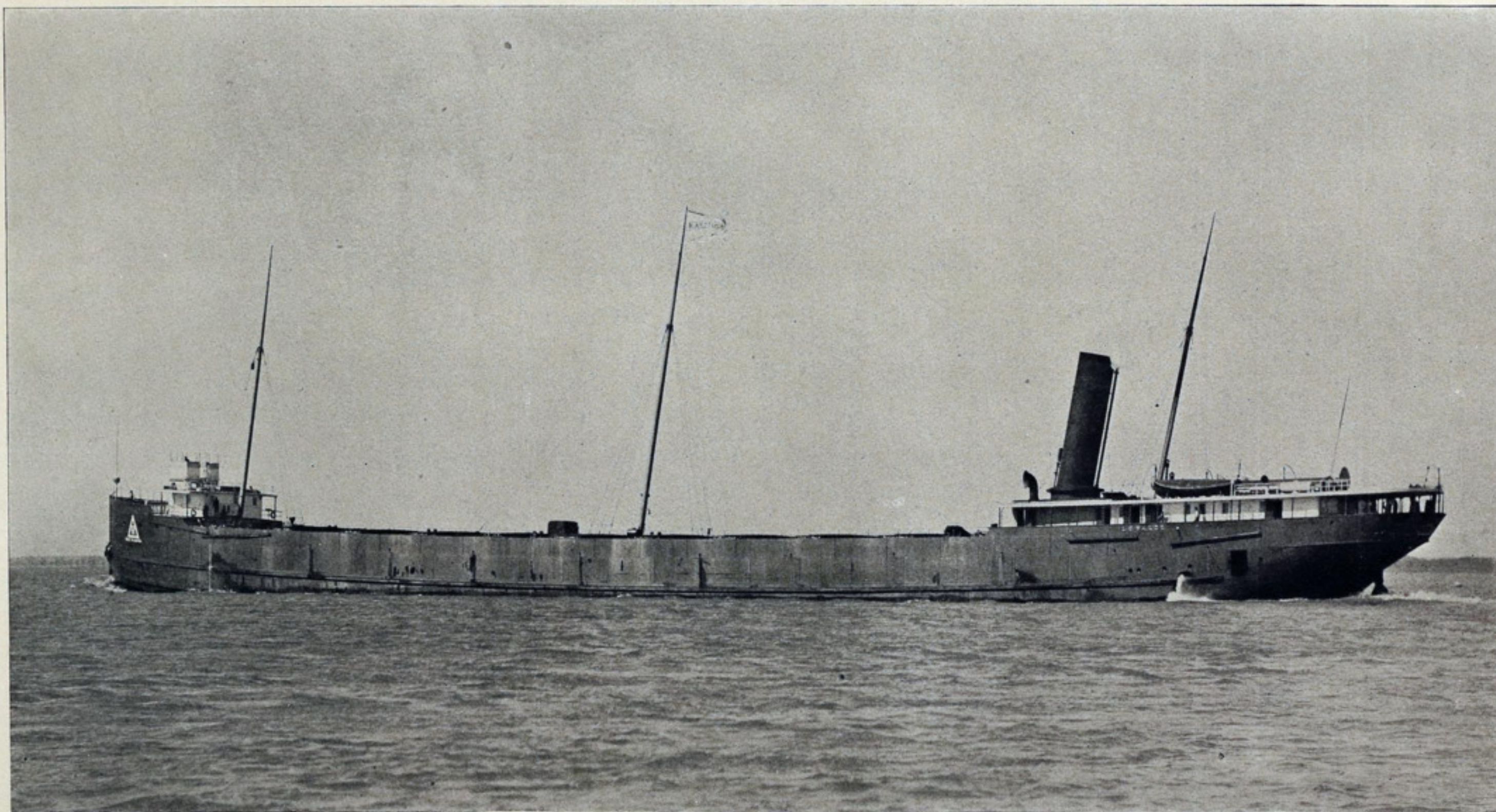


COVERING REMOVED—VIEW COMPLETE.



SECTIONAL VIEW.





SUPPLEMENT TO MARINE REVIEW, OCT. 22, 1896, VOL. 14, NO. 17

BUILT BY F. W. WHEELER & CO.

### STEEL FREIGHT STEAMER L. C. WALDO.

HULL 400 FT. OVER ALL  
380 " KEEL  
48 " BEAM  
28 " DEEP

ENGINES, TRIPLE EXPANSION, CYLINDERS  
23.37 $\frac{1}{2}$ , AND 63 BY 44 INCHES STROKE.  
BOILERS, TWO, 15 BY 12 FEET.

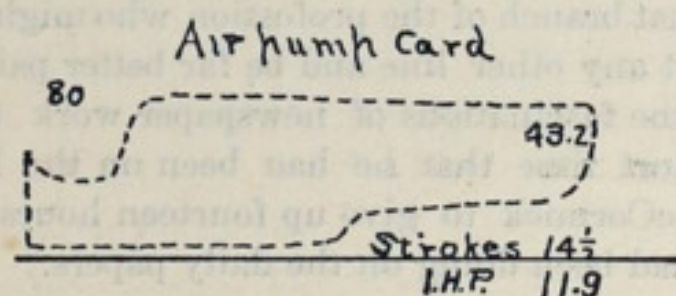
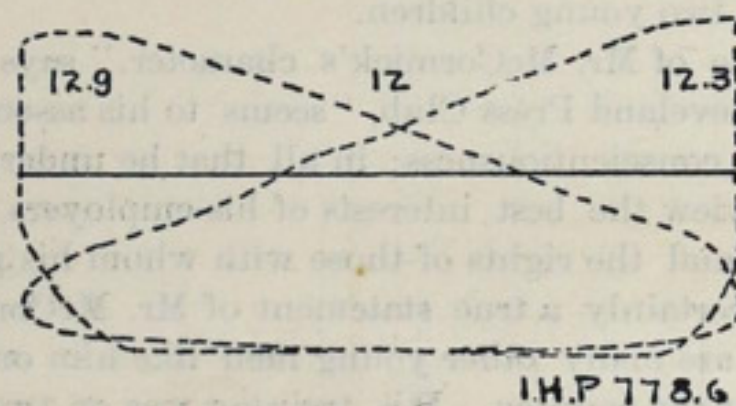
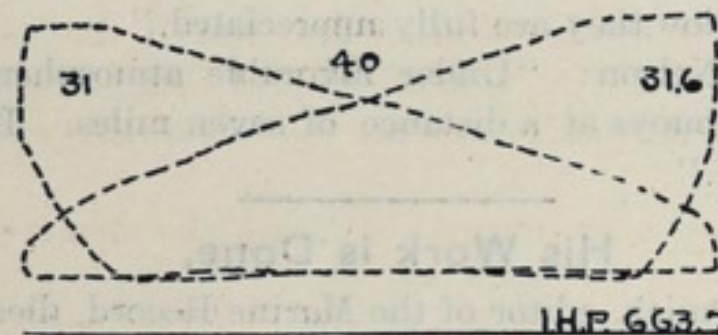
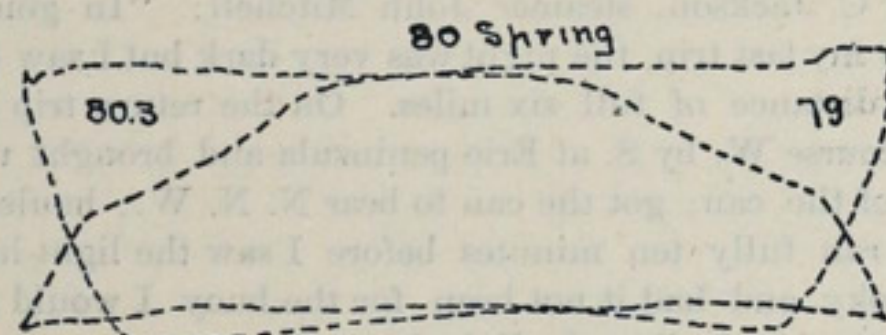


### Test of the Steamer L. C. Waldo.

SHOWING A FUEL ECONOMY 20 PER CENT. GREATER THAN ON THE ORDINARY LAKE STEAMER.

In the table of performances of modern lake steamers in the Blue Book of American Shipping the tests of fourteen steamers are included. On only four of this number does the coal consumption per horse power per hour fall below two pounds. On the other ten it ranges from 2.02 pounds to 2.64 pounds, the average fuel consumption being 2.22 pounds of coal per horse power per hour. It is almost needless to say that none of these ten steamers use artificial draft. Two of the four steamers using less than two pounds of coal per horse power per hour have the Howden system of draft. The most economical showing of any of these large modern steel freighters is that of the Harvey H. Brown, which shows an average, including all tests, of 1.93 pounds, and eliminating a test made under bad conditions reduces this to 1.92

SS L.C. Waldo Test No 4



pounds. Until the steamer L. C. Waldo was built, the Howden was the only system of the draft on the lakes, but the Waldo is equipped with the Ellis & Eaves system. The test of the Waldo published herewith will be of considerable interest to vessel owners and engineers, as it shows a consumption of 1.88 pounds coal per horse power per hour, including all tests, but excluding one test, a short one made with the dampers closed, as an experiment, the result is 1.79 pounds, or a gain of some 20 per cent. as compared with the average of the ten modern lake steamers above referred to.

The test on the H. H. Brown, as well as the one on the L. C. Waldo, was made by George C. Shepard, a mechanical engineer who was not employed by the builders except to make the tests. The test on the Waldo was made with run-of-mine coal and under ordinary conditions.

Inventors of the Ellis & Eaves system will no doubt call attention to the fact that the Waldo's boilers are equipped with plain tubes and not with Serve's ribbed tubes, which they claim is the complement of their draft system, and that by their use an additional 10 or 15 per cent. could be obtained. Allowing 10 per cent. for the Serve's

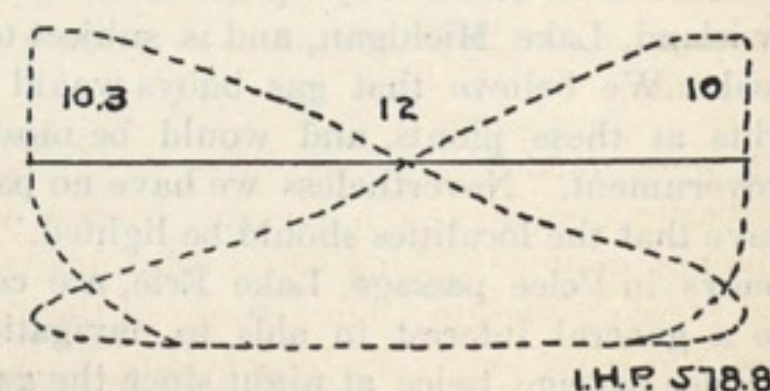
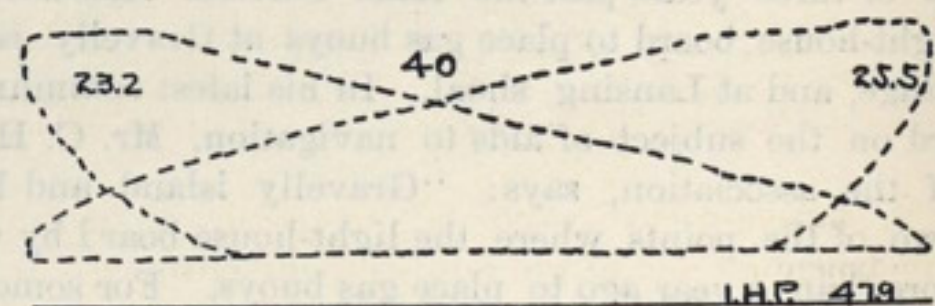
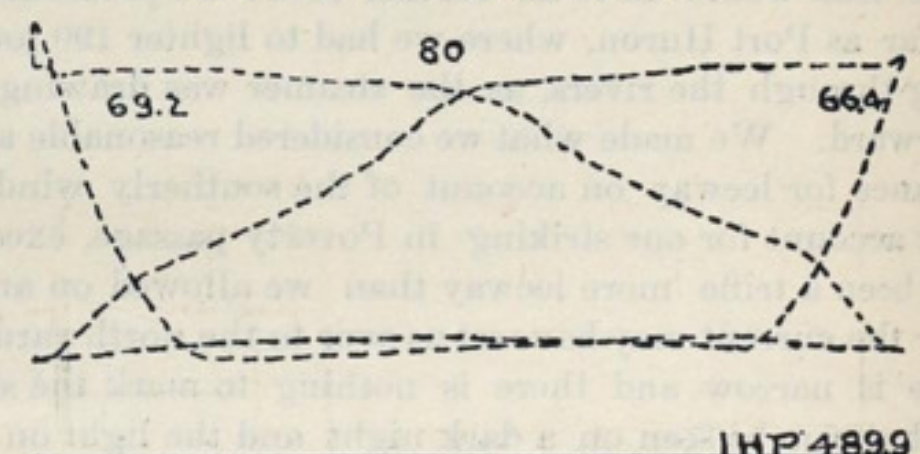
tubes, the Waldo's consumption would be 1.61 pounds, and allowing for auxiliaries, it is not unreasonable to claim a consumption of only 1½ pounds for this system. In view of the fact that the Globe Iron

### GENERAL RESULTS.

NUMBER OF TEST.	1	2	3	4	5
1 Duration, hrs., min.....	5:37	5:57	3:47	5:14	5
2 Displacement, net tons.....	4,258	6,513	6,453	6,446	6,437
3 Area, immersed midship section.....	459.2	685.2	681.2	681	680.5
4 D x 32 ÷ L x B x draft.....	.758	.807	.....	.....	.....
5 Wetted skin surface, sq. ft.....	21,450	25,580	.....	.....	.....
6 Angle of entrance.....	31° 12'	34° 34'	.....	.....	.....
7 Cut off of main engine.....	Inches. 3½, 3¼, 3¾	Inches. 2¾, 3, 2¾	Inches. 2¾, 3¼, 3¾	Inches. 1, 2¼, 1	Inches. 4, 5, 5
8 Mean boiler pressure, lbs.....	166	165.5	166.3	166.4	167
9 " I. P. receiver pressure, lbs.....	55	56.3	55.7	62	56
10 " L. P. receiver pressure, lbs.....	8.03	8.2	9.06	9.4	8.8
11 " vacuum, inches.....	25.5	25.4	25.8	25.3	25.6
12 " revolutions, main engine.....	80.77	83.48	82.34	87.63	76.2
13 " " fan engines.....	265	270	267	361	248
14 " strokes of air pump.....	11	11¾	12	14½	10
15 Referred M. E. P. on L. P.....	24.48	29.39	29.01	30.16	22.56
16 Indicated horse power.....	1,547.7	1,748.4	1,704.2	2,066.4	1,352.3
17 " " air pump.....	.....	9.48	9.64	11.9	.....
18 Heating surface per I. H. P.....	4.02	3.57	3.65	3.01	4.6
19 I. H. P. per square foot grate.....	12.9	14.57	14.2	17.22	11.27
20 Indicated thrust, net tons.....	18.05	19.8	19.5	22.24	16.73
21 Speed, miles per hour.....	14.21	13.3	13.04	14.02	12.04
22 Slip, per cent.....	11.5	19.8	20.3	19.5	20.5
23 D ÷ V ÷ I. H. P.....	488	469	454	448	446
24 Temperature of injection.....	55.6	50	55	57	62
25 " " hotwell.....	110	116	120	130	113
26 " " feed water.....	176	183.5	175	174	187
27 " " at furnace.....	235	285	365	390	350
28 " " fan.....	.....	405	530	590	450
29 Draft at furnace.....	.21	.23	.5	.25	.....
30 " " fan.....	.....	1.55	1.65	2.5	.....
31 Total coal burned.....	15161	20087	14,049	.....	.....
32 Coal per hour.....	2715	3376	3,711	3,546	.....
33 Combustible per hour.....	2370	2947	3,240	3,095	.....
34 Coal per I. H. P.....	1.75	1.92	2.17	1.71	.....
35 " " square foot grate.....	22.6	28.13	30.9	29.55	.....
36 " " ton cargo per mile.....	.....	.063	.071	.063	.....
37 Water per hour.....	24,976	29,782	30,129	33,990	22,882
38 " " I. H. P. per hour.....	16.13	17.03	17.69	16.45	14.69
39 " " lb. coal.....	9.2	8.82	8.18	9.52	.....
40 " " combustible.....	10.53	10.10	9.29	10.98	.....
41 " " from and at 212° per lb. c' mb' stbl.....	11.45	10.91	10.12	11.97	.....

Works Company has secured the exclusive rights for the use of the Ellis & Eaves draft, Serve's tubes and Purves' furnaces on the lakes, this matter of fuel economy will no doubt receive considerable attention. Following is Mr. Shepard's report of the test on the Waldo:

SS L.C. Waldo Test No 1



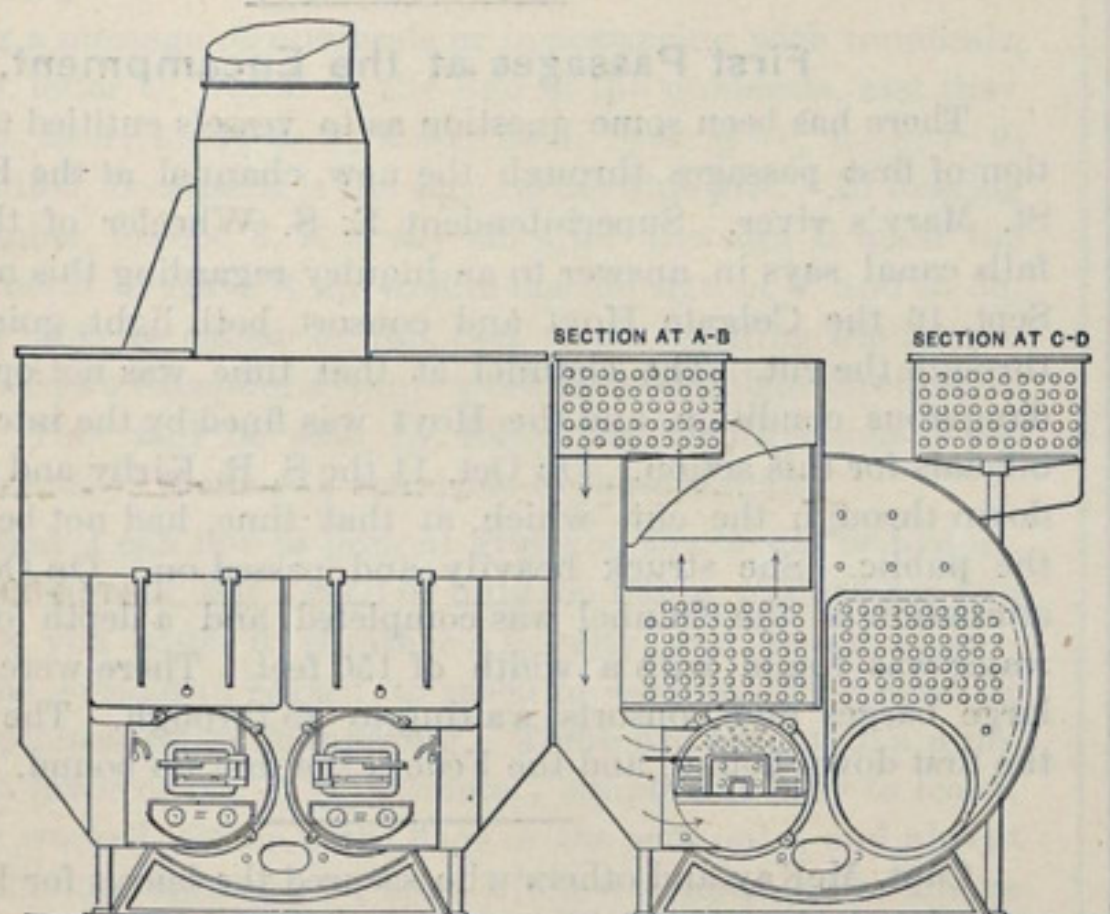
The L. C. Waldo was built and engined by F. W. Wheeler & Co. of West Bay City, Mich., for L. C. Waldo and others during the winter of 1895-96 and went into commission in May, 1896. She was designed for the coarse freight trade and is 380 feet between perpen-



diculars, 48 feet beam and 28 feet deep. Her water bottom is 5 feet 6 inches deep, is divided into ten compartments and has a capacity for 2,100 tons of water. The boilers, built by Wickes Bros., Saginaw, Mich., are situated well aft upon the main deck, and are two in number, placed side by side, with axes parallel to the keel. They are 15 feet diameter and 12 feet long, and built to carry 170 pounds of steam. Each boiler contains three 44-inch furnaces with 5 feet 6 inches grates and 477 2½-inch tubes. The aggregate heating surface of the two boilers is 6,230 square feet, and the aggregate grate surface is 120 square feet, making the ratio 51.92. The peculiar feature in this steam plant is to be found in the Ellis & Eaves system of induced draft. In this system the products of combustion are drawn from the boilers by fans. The air for supplying combustion passes through tubes, over the outside of which the hot products of combustion are being drawn, and by this means the air is highly heated before entering the furnaces under the grates, and at the same time the strength of the draft is independent of the heat of escaping gases and of the wind and weather.

In this particular case the fans are placed one at the back end of each boiler and against the bulkhead between the engine and the boiler rooms. The discharge of the smoke through the funnel is prevented by dampers and is taken over the top of the boilers in large sheet iron boxes, down through the fans, and from thence into the funnel above the dampers. These sheet iron boxes are full of tubes running lengthwise of the same and open at the back end, and it is here that the air for supplying combustion is taken into the system. The air passes through these tubes, is heated in transit and finds its way into the furnaces under the grates through ducts around the breeching. The ash-pit doors hinge upward and contain dampers which were open during all the tests except Nos. 3 and 5. Valves are also provided to admit air above the grates, but these were fastened shut all the time. The fans were of B. F. Sturtevant manufacture.

The main engines are triple expansion, 23, 37½ and 63 inches diameter by 44 inches stroke. Piston valves are on H. P. and I. P.



cylinders. A double-ported valve is on the L. P. cylinder. All pumps are independent and of the following dimensions:

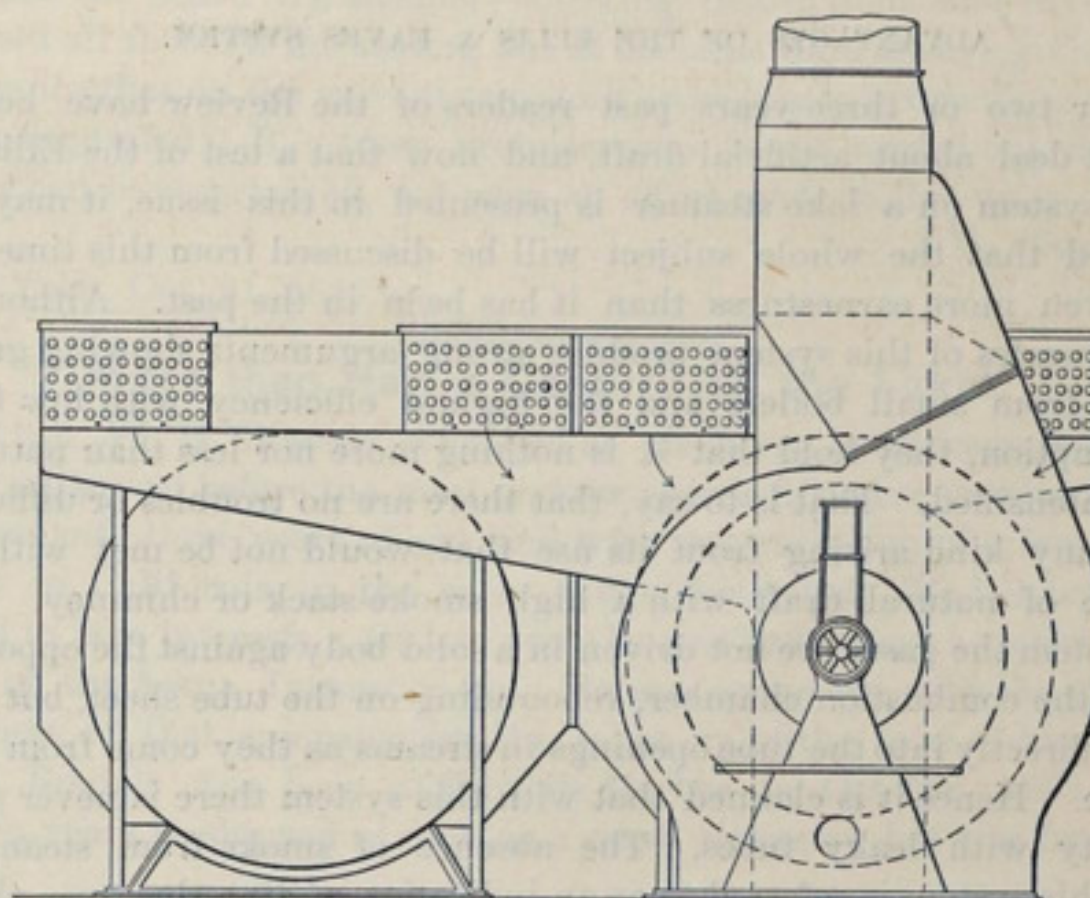
Air pump, single.....	14, 24 by 24 inches.
Two ballast pumps, duplex.....	8, 14 by 16 "
One deck pump, ".....	6, 4 by 6 "
One bilge pump, ".....	6, 4½ by 6 "
One feed pump, ".....	10, 5 by 10 "
One cooler pump, ".....	4, 3 by 4 "

All pumps were made by Dean Bros. of Indianapolis, Ind. The other auxiliaries consisted of a General Electric Company's engine, 4 by 10 inches, double, making 650 revolutions per minute, and one Williamson steering engine. On account of the ease with which the vessel steered the latter took very little steam.

The exhaust from all the auxiliaries passed through the tubes of a feed water heater and raised the temperature of the feed water about 60 degrees. The working platform of the main engine was on the main deck with all pumps below, but controllable from working platform. Steam was taken from a perforated dry pipe in the boiler.

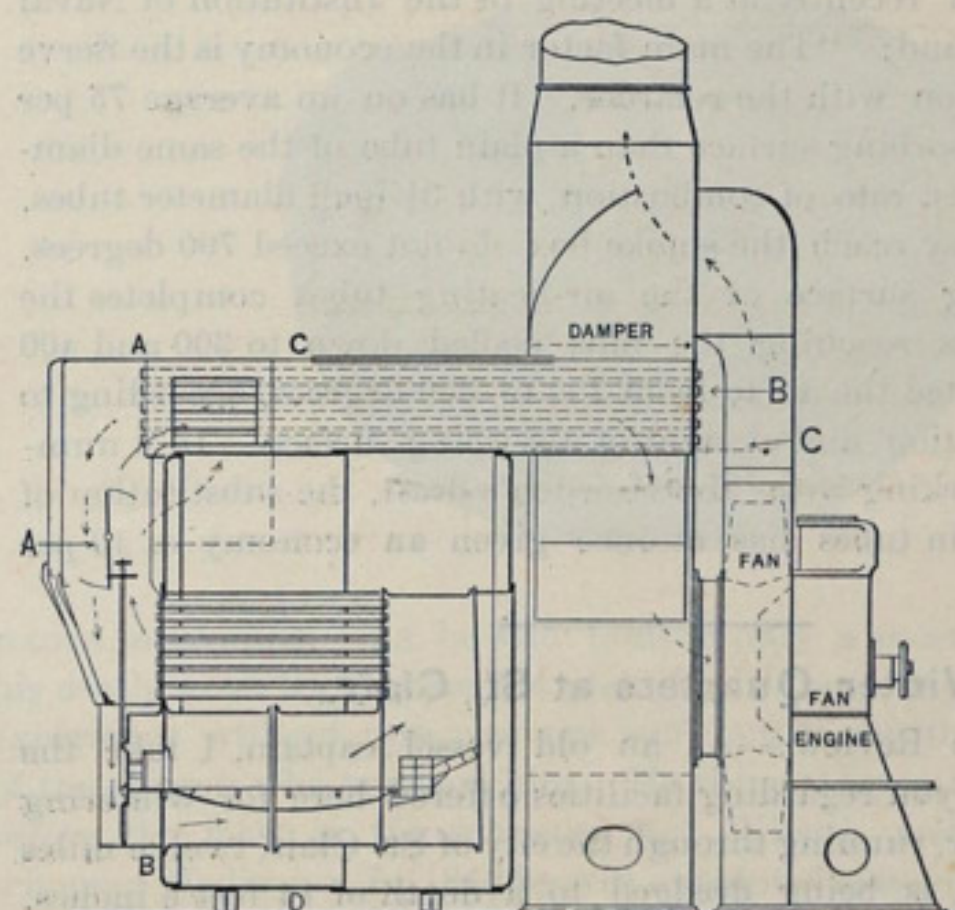
Feed water entered the boiler through internal pipes delivering below the furnaces.

A Union feed water meter, which had been recently calibrated and found to be correct within 1 per cent., was put on a bypass in the feed water pipe between the heater and the boiler. All the coal used during tests was carefully weighed, and the time of starting and stopping each test was so arranged that the fires were all cleaned once



during the test and were in the same condition at the end as at the beginning. In test No. 3 these precautions were observed, but on account of the short duration of the test it did not permit the burning down of the extra amount of coal used in cleaning the fires, and the fires were not in the normal condition at the end of the test.

The pressures, temperatures, etc., are the means of observations



made every hour during each test and the horse power is the mean figured from cards taken hourly. Test No. 1 was made on Lake Huron going up with the vessel drawing 13 feet 8 inches aft and 6 feet forward, compartments aft full and those forward 3 feet deep. During the latter half of the test the electric engine was running. Head wind and sea were encountered up Lake Superior to Devil island. From this point to Duluth, a distance of 68 miles, the speed was 16.3 miles per hour, revolutions 94.5 per minute, and indicated horse power, with all valves in full gear, 2,288.5. Fires were cleaned during this run without reduction of steam pressure. Considerable water still remained in ballast-tanks on reaching Duluth.

The vessel loaded 132,500 bushels of wheat at Duluth, equivalent to 3,975 net tons, and draft forward and aft was 14 feet 5 inches and 14 feet 9 inches respectively.

Test No. 2 was made on Lake Superior coming down. Electric engine was running.

Test No. 3 was made on Lake Huron, coming down, during daylight. Dampers in ash pit were closed.

Test No. 4 was made on Lake Huron in daylight. Dampers were



open. Found no trouble in making steam for this unusual speed. Barometer 30.10 inches.

Test No. 5 was made at night. Dampers were closed.

The condition of engine refers to the distance of the block in the reverse arm from position of full gear.

Weighed all the ashes made during test No. 2 and found them to amount to 12.7 per cent.

Fire hold was cool and entirely free from smoke all the time.

#### ADVANTAGES OF THE ELLIS & EAVES SYSTEM.

For two or three years past readers of the Review have heard a great deal about artificial draft, and now that a test of the Ellis & Eaves system on a lake steamer is presented in this issue, it may be expected that the whole subject will be discussed from this time on with even more earnestness than it has been in the past. Although the advocates of this system produce strong arguments showing great results from small boilers and the highest efficiency with low fuel consumption, they hold that it is nothing more nor less than natural draft intensified. That is to say, that there are no troubles or difficulties of any kind arising from its use that would not be met with in the use of natural draft with a high smoke-stack or chimney. By this system the gases are not driven in a solid body against the opposite side of the combustion chamber, rebounding on the tube sheet, but are drawn directly into the tube openings in streams as they come from the furnace. Hence it is claimed that with this system there is never any difficulty with leaky tubes. The absence of smoke from steamers using this system is referred to as an indication of its value over plain or other systems of draft. Smoke is unconsumed carbon. The proportion of smoke indicates a proportionate waste of fuel, and in this connection attention is directed to the absence of smoke from the stack of the steamer under consideration, the L. C. Waldo, a picture of which under full headway appears as a supplement to this issue.

The accompanying engravings, taken in connection with the written explanation in the test, show very clearly the operation of the system. The following comment on experience with this draft is from a paper read recently at a meeting of the Institution of Naval Architects in England: "The main factor in the economy is the Serve tube, in combination with the retarder. It has on an average 75 per cent. more heat-absorbing surface than a plain tube of the same diameter. At the highest rate of combustion with 3½-inch diameter tubes, the gases, when they reach the smoke box do not exceed 700 degrees. The heat-absorbing surface of the air-heating tubes completes the economy, the gases reaching the fans cooled down to 300 and 400 degree, having heated the air to from 200 to 300 degrees, according to the rate of combustion and amount of absorbing surface. In a number of steamers working with Mr. Howden's draft, the substitution of Serve tubes for plain tubes has at once given an economy of 10 per cent."

#### Winter Quarters at St. Clair.

Editor Marine Review:--As an old vessel captain, I take the liberty of writing you regarding facilities offered here for wintering vessels. Pine river, running through the city of St. Clair, twelve miles from Port Huron, is being dredged to a depth of 14 feet 6 inches. The work will be finished about Nov. 15, and the outlay of \$5,000 makes the river the safest place on the chain of lakes for wintering boats of all kinds. There will be no freshets or heavy flows of ice in the spring on account of crookedness in the course of the river. The city has all facilities necessary for taking care of vessels, including a good ship yard, machine and blacksmith shop, foundry, ship chandlery, etc. From the standpoint of safety, facilities are unequalled, as buildings in the vicinity are few in number and the water power is first class, with a fire department of the best kind. With large salt blocks here, salting of ships can be done very cheaply.

St. Clair, Mich., Oct. 20, 1896.

Geo. H. Couvrette.

Cassier's magazine for November will contain another article pertaining to the fight between engineers and line officers in the navy. It is entitled "Inconsistencies in the United States Navy," and is said to present in a striking manner "the ridiculous policy pursued by the line clique of the navy in trying to belittle the engineering features of the service and to impair its real efficiency." The November number of this magazine will also contain "A Tribute to J. F. Holloway," by Charles H. Loring.

#### Many Cargoes Over 5,000 Tons.

Two steamers of the Rockefeller fleet, the Bessemer and Siemens, both built by the Globe Iron Works Co., Cleveland, now lead all lake vessels in Lake Superior cargoes. The Siemens has just taken out of Duluth, on scant 16 feet draft, a cargo of 174,500 bushels of wheat, equal to 5,235 net tons, and the Bessemer has delivered at Conneaut from Ashland, on 15 feet 11 inches draft, an ore cargo of 4,637 gross tons, full weight, equal to 5,194 net tons. The steamer W. D. Rees has just delivered at the Cleveland & Pittsburg Ry. dock, Cleveland, a big cargo from Lake Superior. She brought down 4,518 gross tons on a draft of 15 feet 10 inches forward and 16 feet 3 inches aft. Corrected cargo records are as follows:

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 10 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000 bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo. From Lake Superior—Steamer Sir William Siemens, Bessemer Steamship Co. of Cleveland, 174,500 bushels of wheat, equal to 5,235 net tons, Duluth to Buffalo, 16 feet draft.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

#### First Passages at the Encampment.

There has been some question as to vessels entitled to the distinction of first passages through the new channel at the Encampment, St. Mary's river. Superintendent E. S. Wheeler of the St. Mary's falls canal says in answer to an inquiry regarding this matter: "On Sept. 16 the Colgate Hoyt and consort, both light, going up, passed through the cut. The channel at that time was not open; was in a dangerous condition, and the Hoyt was fined by the internal revenue officials for this action. On Oct. 11 the S. R. Kirby and consort went down through the cut, which, at that time, had not been opened to the public. She struck heavily and passed on. On Oct. 12 the examination of the channel was completed and a depth of 17½ feet of water was found with a width of 150 feet. There were six or seven large barges and consorts waiting to go through. The Mariska was the first down bound, and the Fedora the first up bound."

Capt. McKay and others who secured the buoys for Pelee passage and placed them in their present positions say that most vessels are not as yet shaping their courses so as to use the buoys to the best advantage. They should run straight for the red buoy, leaving it about 200 feet on the starboard hand; then run straight for the black buoy, leaving it about the same distance on the port hand; then direct for Colchester light, leaving it about a quarter of a mile on the port hand; then for Detroit river light. This would make a practically straight line from the red buoy to the river light. Vessels from Cleveland could shape a course direct for the black buoy and save a little distance. Heretofore vessels have been going much too far north, both at the middle ground and at Colchester.


The department of public works, Chicago, Joseph Downey commissioner, is asking for bids for triple expansion pumping engines. Bids will be opened in two weeks, and marine engine building concerns that would like to bid can get specifications by writing to the above address.

Plates for the new battleship to be built by the Union Iron Works of San Francisco will be furnished by the Bethlehem Iron Co. of South Bethlehem, Pa.



Through the courtesy of Mr. H. H. A. Jones, purser of the Dominion cruiser *Petrel*, the Review is enabled to direct attention to a system of signals made with the arms, and which are in use on the Canadian vessel referred to. Although instruments for carrying sound are now used to considerable advantage on a large number of lake vessels, it is quite probable that conditions would arise when knowledge of this system would prove advantageous. Anyhow, the system is novel and interesting. Following are the signals representing each letter of the alphabet as well as the numerals:

N	F	/		\	7	1	F	K	+	!	Y	T	↑
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	2	3	4	5	6	7	8	9		0			
f	t	y	r	s	l	y	j	w	x	z			
O	P	Q	R	S	T	U	V	W	X	Y	Z		

At short distance, when the arms can be easily seen, no further aid is required to send a message, but when this can not be done, two small flags are used (red or white), about 12 inches square, made fast to sticks about 18 inches long, leaving enough of the stick to be held in the hands, thus 

"I regret that I can not at present give you the origin or history of this system of signals, but I shall be only too happy to do so for you if possible. As you state, it is rather a novelty, and as one experiments with the system in regard to speed in reading off or sending messages, it becomes quite fascinating. There are also quite a number of points in favor of it. It is extremely simple and easy to learn, and it can be worked either with flags or the arm only, and also at night with common lanterns. I have often wondered, since I have been on the great lakes, that no system has been introduced among the sailors, especially for occasions like the grounding of vessels, vessels passing belonging to the same company, and other instances where a system like the one mentioned here would be extremely useful. I shall be pleased to assist anyone desirous of learning these signals. With regard to speed, I may add that with constant practice some of the men under my instruction have, and can read messages at an average speed of seven seconds per word. Of course, that was at close range, but it will give you an idea of what can be done with it."

Editor Marine Review:—Leaving out personalities, I am obliged to again criticise adversely the engineering on the steamer North Land, which was utterly at variance with the instructions given for the management of the fire-rooms. If these instructions had been only partially carried out, the case would have been relieved of much that is now to be deplored, and the fuel consumption largely reduced. There was no valid reason for this neglect, especially as the general manager and marine superintendent ordered the engineering department to observe the printed instructions strictly. In addition to

I am simply defending the Belleville boilers against incompetent management. The communication in your issue of Oct. 15 defending the engineering on the North Land, is quite in harmony with the practice on board the steamer—shirking instructions and inventing excuses all through the season, but at the same time always giving the assurance that on the current trip work according to instructions would be inaugurated. But these promises were never carried out, and, so far as can be ascertained, not even an effort made to live up to them.

M. Coryell.

New York, Oct. 21, 1896.

Capt. W. H. Rounds, who died at his home in Chicago on Monday last, served before the mast on lake vessels fifty-five years ago. He was seventy-three years of age, and with the exception of a few years spent in California in the early fifties, his whole life has been devoted to lake interests. Of late years he was best known as representative of the Aetna Insurance Co. He was connected with the marine business of that company on the lakes up to the time of his death. Capt. Rounds was born at Sacketts Harbor in October, 1823. At fifteen years he shipped as cook on a small schooner, but was forced to



Geo. C. Shepard, well-known mechanical engineer of Cleveland, has accepted a position with the Union Iron Works, San Francisco, and leaves for the Pacific coast this week. Mr. Shepard was the first engineer to make exhaustive tests of lake steamers, determining fuel consumption and other important information, which has led to various improvements in the operation of engines. Now that the matter of fuel economy has attained such importance, the value of this work and the data which he collected will be appreciated more than ever.





DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total.....	347	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

\* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/4 per cent. of the whole, but largely in American vessels.

As a trade publication the Review has from the date of its first issue avoided all reference to politics; not that we do not recognize the importance of many political questions when applied to lake shipping, especially in these times of depressed business on account of disturbed finances, but it will be admitted that the successful trade journal is the one that deals with business matters entirely; that aims to lead in the special line to which it is devoted, not by parading its own opinions, but by collecting and publishing reliable information from the best sources in the trade which it seeks to represent. The best trade journal is the one that the business man finds time to read during business hours. But in the present national campaign the question of finances appeals so directly to men in all lines of business that fixed rules and customs are being broken and everybody is something of a politician. The correspondence of business men all over the country is full of argument against any change in our system of finances, and the object lessons brought out are numerous and convincing. One of these comes from the Berlin Iron Bridge Co. of East Berlin, Conn. This company has received from its representative at C. Lerdo, Mexico, the contract for an iron market house at Guadalajara. If this market house were built anywhere in the United States and paid for in our own money, the contract price would be \$5,615. The Berlin company is, however, to receive in payment for this building Mexican silver dollars, and their contract price with the city of Guadalajara is, on this account, \$11,230. This prompts the Berlin company to ask some questions. "If Mr. Bryan and his populist platform should prevail," they say, "and there should be free coinage of silver on the basis of 16 to 1, what is to prevent the Berlin Iron Bridge Co. from taking the dollars which they receive in payment on this building, each one of which contains more silver than the American dollar, take these to the United States mint and, free of expense, have them coined into American silver dollars? Under free silver they will then receive for their building 11,230 Bryan dollars, which Mr. Byran claims will be worth as much as gold dollars, consequently they can be used in paying the employees, thus leaving the company a clear profit of over \$5,000 on this one contract. Or, again, they can take these same 11,230 standard silver dollars and with these pay the labor and expense of building another market house, another bridge or building of any kind for the Mexican market, and receive for the same 22,460 Mexican dollars. They can then recoin these, free of expense, into American dollars and thus by each transaction double their money. Does any laboring man in this country believe that labor paid for in

money of that kind will have the purchasing power of our present dollar? Would there be any difference in paying labor in these dollars and in reducing the present rate of wages 50 per cent? Who, under the circumstances, will be benefited by free coinage, capital or labor?"

One after another the inventors of deep sea diving apparatus go on spending money in attempts to locate the steamer Pewabic, sunk years ago in Lake Huron. Scarcely had the effects of the Myers expedition been sold for debts contracted in a vain attempt to find the boat, when Capt. Geo. P. McKay of Cleveland, who was in command of the Pewabic when she was sunk, had an inquiry about the boat from John D. Beebe of Columbus, who says, "he has spent the past year experimenting on deep-water work, and will soon be in position to put his new creation into execution." He wanted information as to dimensions of the boat, her probable location, etc. Capt. McKay answer all such communications in a courteous and straight forward manner, but it is probable that some of the people making inquiry are inclined to doubt him when he surprises them by stating positively that a quantity of copper was the only thing of value that went down with the boat.

The suggestion, made by some of the lake captains, that all boats bound up through the Sault river, when running light, use the old channel at Sailors' Encampment, leaving the new cut to the deep-laden down-bound boats and to boats carrying up cargoes, is certainly worthy of consideration and will be carried out by some masters. It would seem that a suggestion of this kind should receive consideration from the Lake Carriers' Association during the coming winter when the matter of changing the Sault river regulations, if they are to be changed, is under consideration. The deep-draft vessels will locate new obstructions in the Sault river, just as they did at Ballard's reef and near the Lime-Kilns in the Detroit river, and too much care can not be taken in making navigation as safe as possible until the projected deep draft is uniform throughout the connecting rivers of the lakes.

With November, the closing month of the lake navigation season, at hand, a few losses in vessel property that will fall quite heavily on the underwriters are recorded, but it is pleasing to note that these accidents have not been attended by any loss of life, and unless the property losses from this time on prove very heavy the underwriters will mark up big profits on the season's business.

### Increased Use of Open Hearth Steel.

Andrew Carnegie is quoted as saying that the rapid growth of the open hearth process of steel making is changing the character of the output. Engineers are now all specifying open hearth steel. It is impossible to sell Bessemer steel for ships, bridges, boiler plates, or even for those enormous twenty-two story steel structures which are going up throughout the country. Open hearth steel is now sold almost, if not quite, as cheaply as Bessemer. This is rendered possible by the lower price of the Mesaba and non-Bessemer ores of Lake Superior than the ores necessary for the Bessemer process, the ores being suitable for open hearth practice. If the movement continues, he says, we are likely to see less demand for Bessemer ores, and therefore the tendency will be for the Bessemer and non-Bessemer ores to become nearer an equality in price, and this may give the Bessemer steel a slight advantage in cost. If so, it will continue to be used for billets, and a thousand and one ordinary purposes. But there will still remain a large market for open hearth variety. So confident is one of the leading concerns in the United States of this that today it is erecting sixteen forty-ton open hearth furnaces, having already twenty in operation, so that this concern will have thirty-six open hearth furnaces, capable of producing 90,000 tons of open hearth ingots per month—say about 1,000,000 tons per year. This shows wonderful confidence in the market for open hearth steel. It is but proper to say, however, that this concern has large interests in Mesaba ores, and has also command of very cheap gas coal as well as of natural gas, which is found to be remarkably well adapted for open hearth practice.

An advertisement elsewhere in this issue calls for proposals on 12,500 feet of breakwater extension at Buffalo.

Hunters' excursion rates are offered by the Nickel Plate road to points in Michigan, Wisconsin and the southwest. 339 Nov. 1.



### Steam Yacht Races.

Editor Marine Review:—I have been very busy lately and have just found time to read the remarks in your issues of Sept. 24 and Oct. 1 in regard to the Enquirer—Say When yacht race. I hope to get time, later on, to discuss this matter again, but "business before pleasure." We are just now rushed with orders. One of the great difficulties in the way of arriving at a definite conclusion as to power developed in this race seems to be the lack of indicator cards from which to make accurate calculations. Everything seems to be guess work and much figuring is done to prove what power has probably been developed. I am trying to get accurate information in regard to some eastern yachts, and, if I succeed, I will give you the results.

The steam yacht Marietta is probably the fastest cruising yacht of her inches in this vicinity, and we wrote to Commodore Moore lately asking him to inform us of the indicated horse power developed by her engines. In reply, we received the following letter from him, which is very complimentary to the Roberts boiler, even if it does not furnish the information asked for:

Roberts Safety Water Tube Boiler Co., New York Gentlemen:—In reply to your favor of the 12th inst., in relation to the indicated horse power the Marietta is able to develop, will say that I have never taken any cards from the engines. In relation to the measurements of the yacht, will say that she is 143 feet over all, 16 feet beam, and 9 feet 11 inches hold. The only accurate account I have of the Marietta's speed is from trying wheels between a buoy off Larchmont and one off Glen Cove, the distance being a little over two miles. I never have run her over a course under full pressure. The last wheel I tried she made an average of 19.88 miles with 180 pounds of steam running under natural draft. Of course I was not speeding the boat; I was simply experimenting with wheels, and when I do that I do it at a pressure that I know I can maintain for any distance. Her engines are 12, 18 and two 22's by 15 inches stroke. She makes 300 turns with 200 pounds of steam.

H. B. Moore.

New York Lighterage & Trans. Co.

No. 6 Broadway, New York, Oct. 12, 1896.

I will say, however, that the Marietta has a reputation of twenty-one miles per hour under forced draught and burning anthracite coal. Her owner has built quite a number of yachts and has always used Roberts boilers. He has been offered other types of boilers but believes in "letting well enough alone." He has some sporting blood in his veins and is always willing to back his boat against any competitor, even to the tune of several thousand dollars. You will probably recollect him as the winner of the celebrated Pampero-Dandy race on Lake George about five years ago. He was the owner of the Pampero and she had a Roberts boiler, which carried 325 pounds of steam during the race. According to the terms of the wager, the loser paid for a special train of parlor cars from New York to Lake George (with the usual refreshments for both ladies and gentlemen en route,) three days board for the friends of both parties at the Fort William Henry hotel, the charter of the steam boat Horicon to follow the race, and a banquet for the invited guests and the members of the Lake George yacht club on the evening after the race at \$10 per head. I will only add that many of the guests were "seasick" while returning to New York by rail.

E. E. Roberts.

The Roberts Safety Water Tube Boiler Co.

Nos. 39 and 41 Cortlandt street, New York, Oct. 16, 1896.

P. S. I understand that Mr. Fairburn has gone to Europe in the interests of the Bath Iron Works, and it would hardly be fair to reply to his criticisms during his absence.

### Improve Lake Erie Harbors.

Editor Marine Review:—The interesting article in the Review of Oct. 15, relative to "Lake Front Docks," calls attention to matters which should receive the careful consideration of every one interested in the future commercial prosperity of Cleveland. The city on Lake Erie which first furnishes adequate facilities to properly handle the traffic which will be developed by the improvements now being made in the lake waterways will unquestionably secure a large percentage of the increase. The increase in depth of channels already obtained is having a very marked effect on Lake Superior traffic, and the project to regulate the lake levels, which has been temporarily pigeon-holed through the influence of the army engineers, is almost certain to be carried out in the near future, the completion of which will permit

vessels to load for maximum draft throughout the entire season, and will no doubt have a greater influence on lake commerce than the improvements now being executed. If the citizens of Lake Erie cities wait for the general government to solve the problem of securing adequate harbor and dock facilities, it is quite certain that their descendants will never have occasion to boast of the good judgment exercised in the matter.

Civilian.

Cleveland, Oct. 19, 1896.

### Officers of the Light-House Service.

A list of officers of the United States light-house service throughout the country, which has just been published by the treasury department, gives these officers in lake districts:

Ninth district—The inspector of this district is Commander James H. Dayton, U. S. N., room 1308 Chamber of Commerce building, corner of Washington and La Salle streets, Chicago. The engineer of the district is Major Milton B. Adams, U. S. A., No. 18 Bagley avenue, Detroit.

Tenth district—Inspector, Commander Charles V. Gridley, U. S. N., Post Office building, Buffalo, N. Y.; engineer, Lieut. Col. Jared A. Smith, U. S. A., Hickox building, Euclid avenue and Erie street, Cleveland.

Eleventh district—Inspector, Commander W. M. Folger, U. S. N., No. 80 Griswold street, Detroit; engineer, Major M. B. Adams, U. S. A., No. 18 Bagley avenue, Detroit.

The chairman of the light-house board, who is the chief officer of the service throughout the country, is Rear Admiral John G. Walker, U. S. N., No. 1202 Eighteenth street, N. W., Washington, D. C. The naval secretary is Commander Geo. F. Wilde, U. S. N., Washington, D. C., and the engineer secretary is Capt. John Millis, U. S. A., also of Washington.

### New York State Canal Improvements.

Improvements in New York state canals involving an expenditure of \$3,368,439 will be undertaken when the canals are closed to navigation next month. Advertisements calling for proposals on a large part of this work have already been published. This is the first expenditure under the \$9,000,000 appropriation authorized by a vote of the people of New York state in November a year ago. The canal board, which consists of five elective state officers, together with the state superintendent of public works, has thus far approved of plans and specifications as follows: Erie canal, eastern division, \$753,090; middle division, \$1,015,283; western division, \$1,042,844; total, Erie canal, \$2,118,217; Champlain canal, \$409,502; Oswego canal, \$147,720; grand total, \$3,368,439. It is understood that the work of improvement is to start at the eastern end of the Erie canal. The western division will hardly be touched during the coming winter. Specifications may be obtained from Geo. W. Aldridge, superintendent of public works, Albany, N. Y. Bids will be opened Oct. 29.

### Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Oct. 17, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago .....	15,361,000	7,228,000
Duluth .....	5,477,000	22,000
Milwaukee .....	336,000	68,000
Detroit .....	492,000	59,000
Toledo .....	772,000	17,000
Buffalo .....	1,880,000	243,000
Total	24,318,000	7,637,000

As compared with a week ago, the above figures show at the several points named an increase of 163,000 bushels of wheat, and 487,000 bushels of corn.

As usual, the Bethlehem Iron Co. of South Bethlehem, Pa., has again secured a big share of the contract for gun forgings for the United States navy.

Tonnage of the Rockefeller steamer Robert Fulton, built by the Detroit Dry Dock Co., is 4,219.74 gross and 3,181.95 net tons.

The Nickel Plate road offers excursion rates to points in Wisconsin, Michigan and the southwest for hunters.

338 Nov. 1.



### Around the Lakes.

Mr. John F. Pankhurst of the Globe Iron Works Co., Cleveland, is preparing for a trip to California.

James Rooney of Toledo is now the owner of the tug Wisconsin. He bought her at marshal's sale for \$4,775.

It is probable that some of the canal boats of the Cleveland Steel Canal Boat Co. will be kept in service during the winter in the coal trade on Long Island sound.

At the coal dock of B. Uhrig & Son, Milwaukee, the steamer Fred Pabst, carrying 2,900 net tons of coal, was unloaded recently in 9 hours and 55 minutes, actual working time.

There are some fears of another grain blockade at Buffalo. During the forty-eight hours ending Monday evening the cargoes of vessels arriving at Buffalo aggregated 3,000,000 bushels.

The award of the contract for the new Rockefeller tow barges to the Globe Iron Works Co., Cleveland, is proof of the statement that the job would certainly go to the lowest bidder. It was thought that Mr Rockefeller's interest in the American Steel Barge Co. might help that concern to secure the contract, but such was not the case. The specifications demand in every particular a steel tow barge equal to the best that has ever been built on the lakes.

It is quite probable that the Leatham & Smith Towing Co. will file a salvage claim in connection with the work of getting the burned steamer Australasia into shoal water. The published accounts of the accident to the Australasia do not agree with another story that comes from Sturgeon Bay, from which point the tug John Leatham was hurried to the scene on receipt of a telephone warning forwarded from Bailey's Harbor. The captain of the Leatham states that the Australasia was four miles off land when he reached her and had been abandoned by the crew, the life-savers having taken the latter to Jacksonport. The Leatham, he says, then got a line to the Australasia, intending to take her to the Sturgeon bay canal entrance. Finding this impossible, he claims to have towed the steamer ashore and then scuttled her by ramming a hole through her side. While this may possibly have been the case, it is hardly probable, as no one is prepared to believe that a tug could perform such a ramming feat with out losing her stem and in fact shattering her entire bow. But the towing company will probably file a salvage claim just the same.—Milwaukee Evening Wisconsin.

### A Broadside of Search Lights.

In the great water commerce display to take place in New York on Saturday evening, Oct. 24, electricity will take a leading part in the illumination of vessels, but surpassing this will be the great display of the Rushmore Dynamo Works, makers of the Rushmore high power projectors. Their seven story factory is on the water front in Jersey City, nearly opposite the reviewing point at the Battery, and on the roof they will have fifteen projectors of the most powerful type, which will be operated by skilled attendants, who have been drilled to work the lights together to produce some wonderful effects. As each projector throws an intense beam extending beyond the range of vision, with the large number all working together the western sky will be one blaze of light. The large amount of current required will be supplied by a 250 horse power Corliss engine driving a Rushmore dynamo, which by day furnishes power throughout the works. A large number of ships that are to be in the parade are equipped with projectors and the intention is to work both the land and the floating lights together to give the best effect from the shore.

Porter Bros., Duluth, were the lowest bidders on a job of about 410 feet of riprap embankment at Agate Bay, Minn., on which Major Clinton B. Sears, U. S. A., opened bids at Duluth on the 20th inst. Their bid was \$63.17 per running foot of embankment. Other bids were: Wm. H. Randall, West Duluth, Minn., \$91.34; Jacob H. Carlson, Duluth, Minn., \$71.15; Samuel Neniece, Duluth, Minn., \$84.20; Tulloch Bros. & Magee, Duluth, Minn., \$85.90; A. & D. Sang, Duluth, Minn., \$89.25; Jacob Zimmerman, Duluth, Minn., \$75.48; Geo. R. King & Hugh Steele, Duluth, Minn., \$71.90; Cooper & Doubleday, St. Paul, Minn., \$157.98; Elisha G. Gay, Oneida, N. Y., \$205.00; Wm. McCurdy of Houghton, Mich., and Alex. McCurdy of Duluth, Minn., \$81.00; Powell & Mitchell, Marquette, Mich., \$76.48; Walter H. Singer, Duluth, Minn., \$85.00.

### A Photographic Enterprise.

The Marine Review has in hand the results of sending a photographer to the mouth of the Detroit river, where he remained for more than two weeks taking photographs of representative lake steamers. Some sixty 11x14-inch negatives have been secured, and from them we are having prints made and mounted on 14x17-inch cards, making the handsomest photographs of lake steamers yet published. Orders have been received for a large number of these photographs, and single prints of nearly all of the sixty views are now ready for inspection at the Marine Review office, Perry-Payne building, Cleveland. Any one who orders by mail and is not satisfied with the pictures may have their money refunded. The price for single prints is \$1.50, or four prints to one address for \$5. In addition to the views of the different boats, there is a panoramic view, 11x28 inches, showing Bois Blanc island, the channel, Amherstburg, Lime-Kilns crossing, etc. This is one of the prettiest and best known views on the lakes, and the photographer does it justice. No finer picture for the home of a marine man can be imagined. The price of this picture is \$3, and it will be furnished with a neat matt and frame around it for \$5. Following is a list of the vessels photographed:

Adams, Tom	Majestic,
Bartlett and two whalebacks,	McWilliams, J. J.
Bessemer, Sir Henry	Mohawk,
Centurion,	Maricopa,
City of Genoa,	Nicholas, I. W.
Commodore,	North Land,
Connelly Bros.	Northern Light,
Chili,	Orr, Geo. N.
Chisholm, Wm.	Owego,
Cranage, Thos.	Pabst, Fred
Curry, S. S.	Parnell, Chas. S.
Devereaux, J. H.	Pontiac,
Edwards and barge,	Presley, Geo.
Fairbairn,	Republic,
Frontenac,	Schuyllkill,
Gladstone,	Scranton,
Harlem,	Senator,
Harper, John	Stafford,
Hesper,	Spencer, Geo. and barge
Iosco,	Spokane,
Iron King,	State of Michigan,
Italia,	Tuscarora,
James, H. R.	Waldo, L. C.
Kearsarge,	Ward, Eber
Kirby, Frank E.	Weed, Emily P.
Marina and barge,	Yale,
Masaba,	Zenith City,

It is quite evident that the manufacturers all over the country are expecting a big change for the better immediately after election. The tone of business letters is entirely in this direction. In a letter just issued to patrons of the Magnolia Metal Co., New York, the president of that company, Mr. C. E. Miller, says: "The business men of the country have passed through a trying ordeal for some months back, but we believe that the stagnation and dullness in trade will end with the 3rd of November, and that a new and better condition of things will prevail." Then follows a statement of the business policy of the company, so written as to indicate expectations of a general return of prosperous business conditions. It is remarkable that prices of Magnolia metal, on account of its worth, have never been reduced during the dull period of two or three years past.

The Goodrich line steamer Muskegon, which was wrecked while in dock at Milwaukee, has been stripped of her cabin outfit and will be sold at auction Nov. 10. This course is taken by the Goodrich company with a view to suing the Milwaukee Dry Dock Co. for the difference between what she may sell for and her Inland Lloyds insurance valuation.

## FOR SALE.

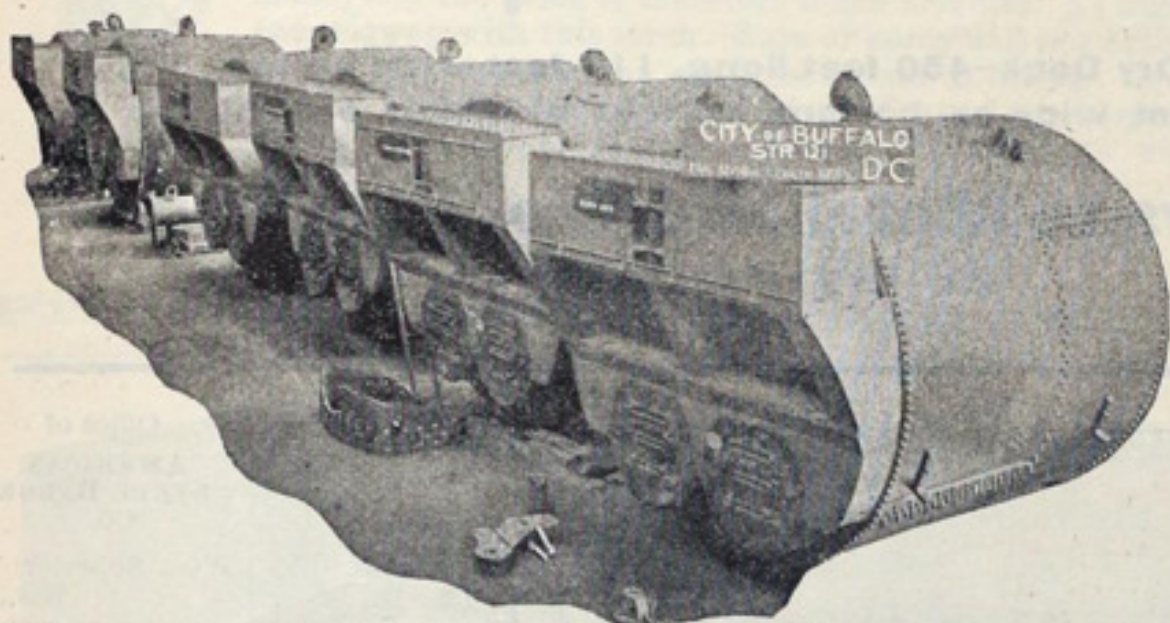
**Naphtha Cruising Launch**, 38 feet long, 8 feet beam, cabin with four berths, with wash room, ice box, and all modern conveniences, beveled edge plate glass windows, and mahogany finish throughout. Speed 10 miles per hour, brand new last year, and for sale cheap for cash if taken at once. For further particulars address **Box 616, Toledo, O.**

Dec. 1



# Air is Cheap—Cheaper than Dirt!

## FUEL IS DEAR—VERY DEAR! USE AIR AND SAVE FUEL!



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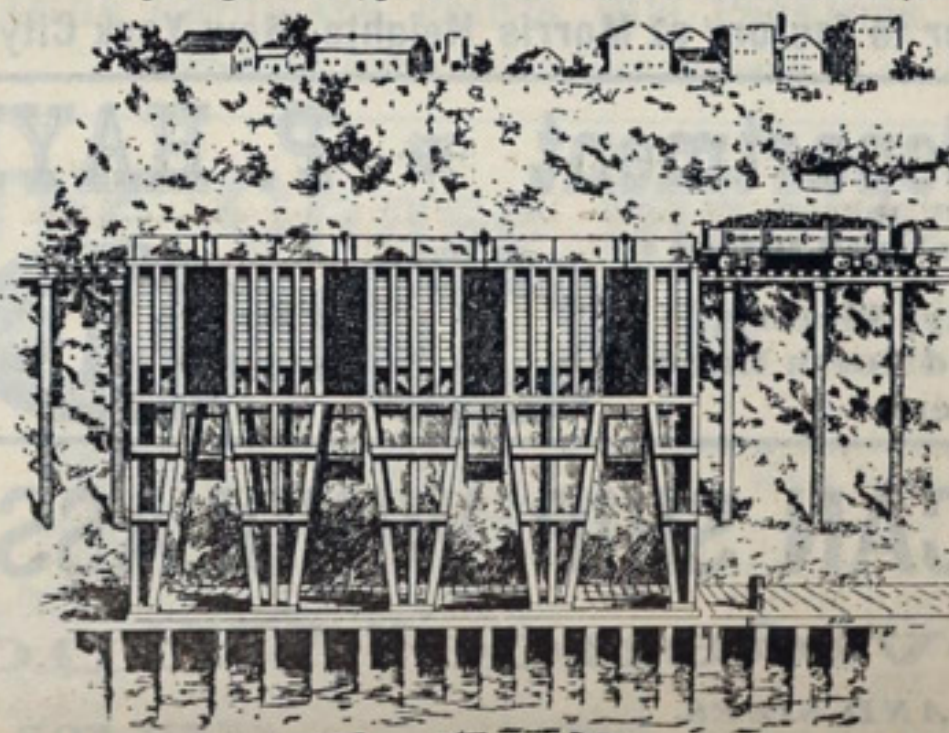
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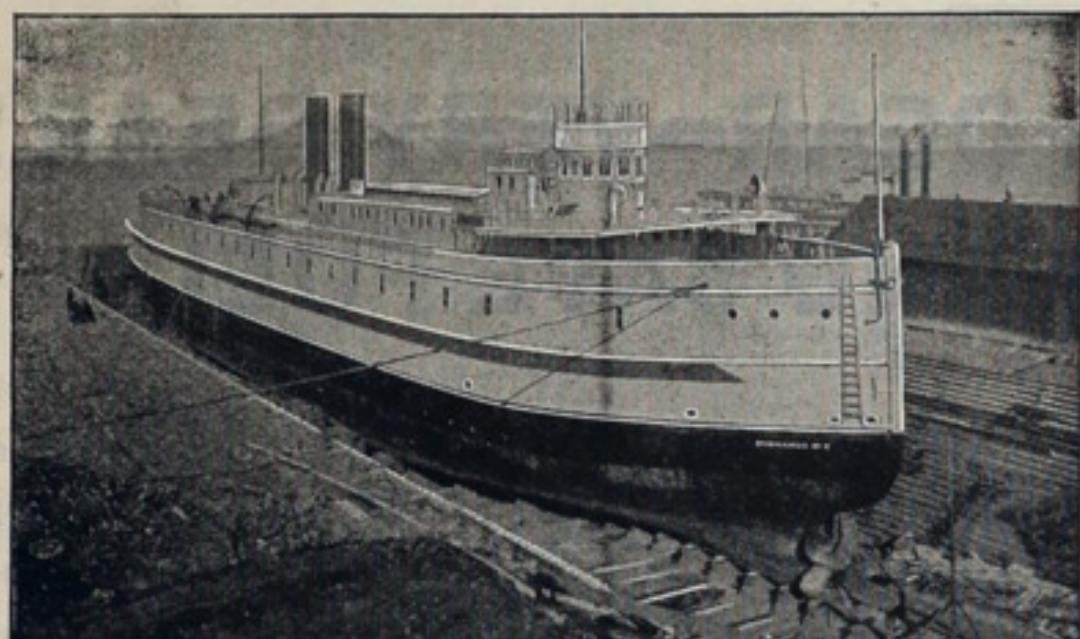
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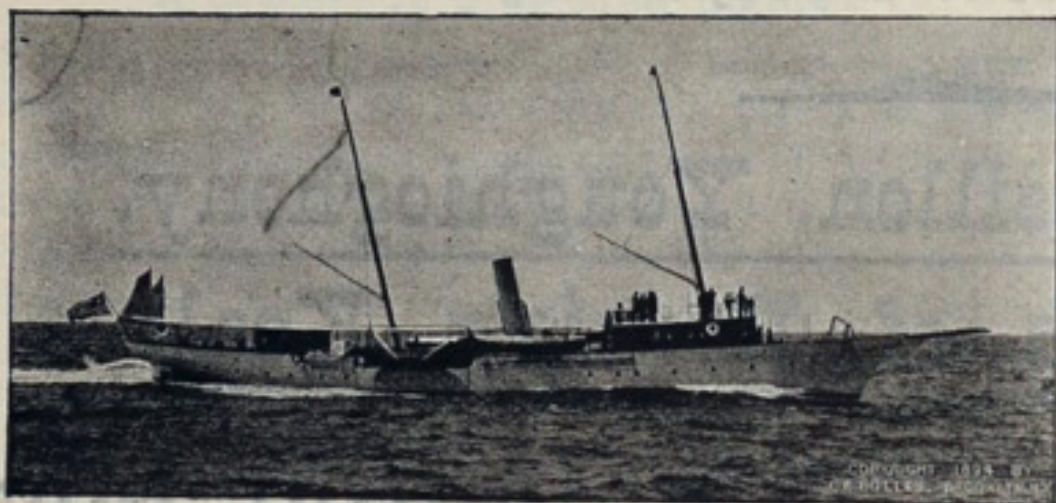
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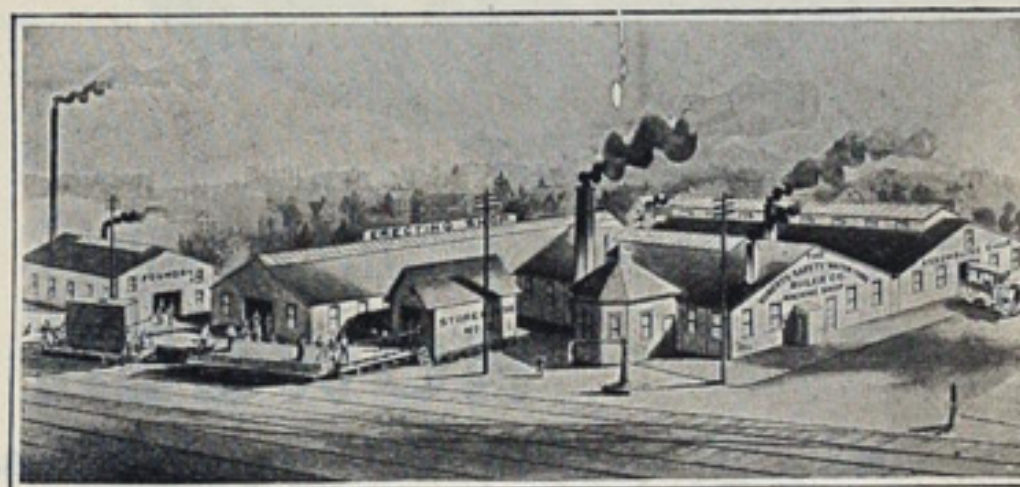
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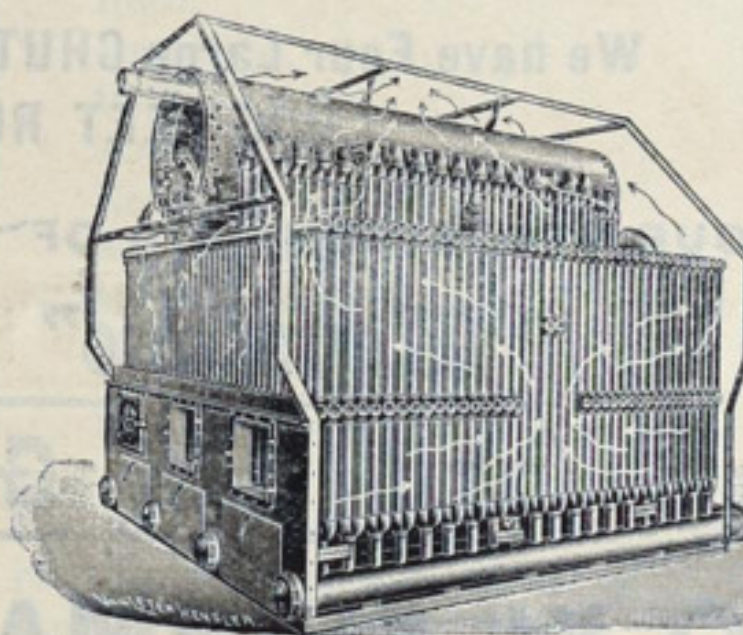
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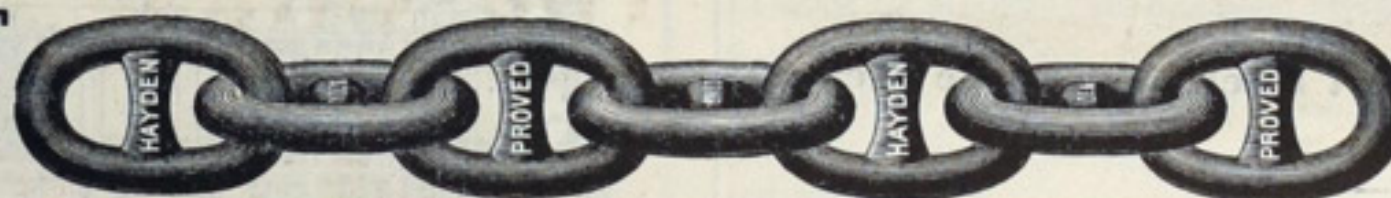
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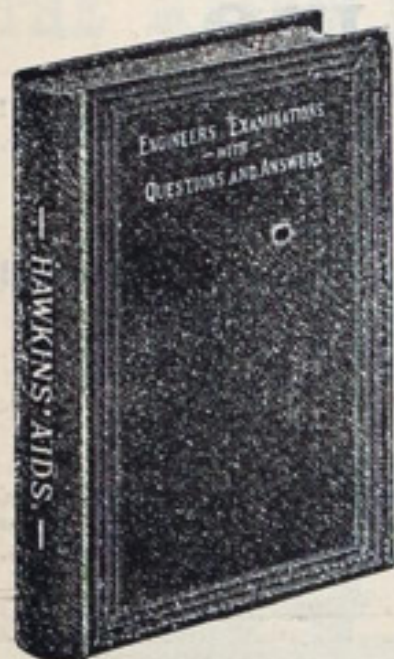
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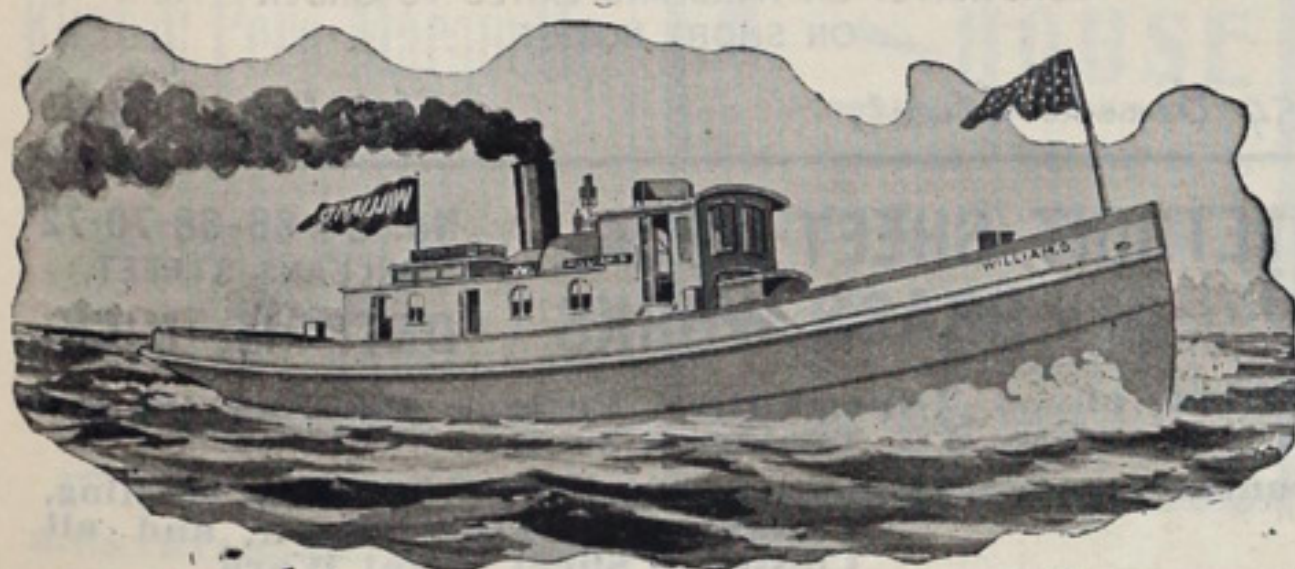
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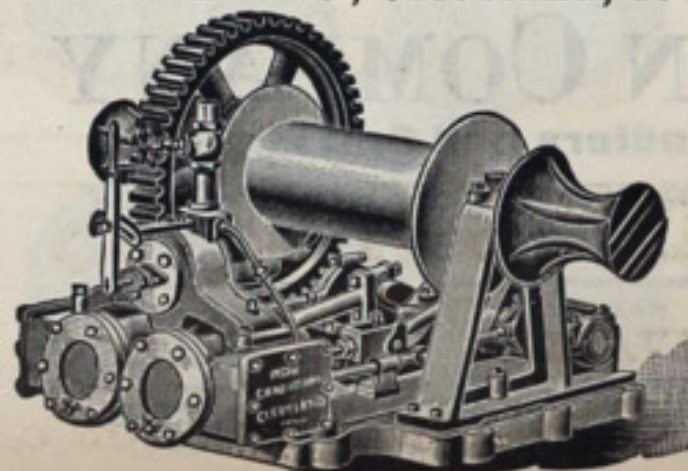
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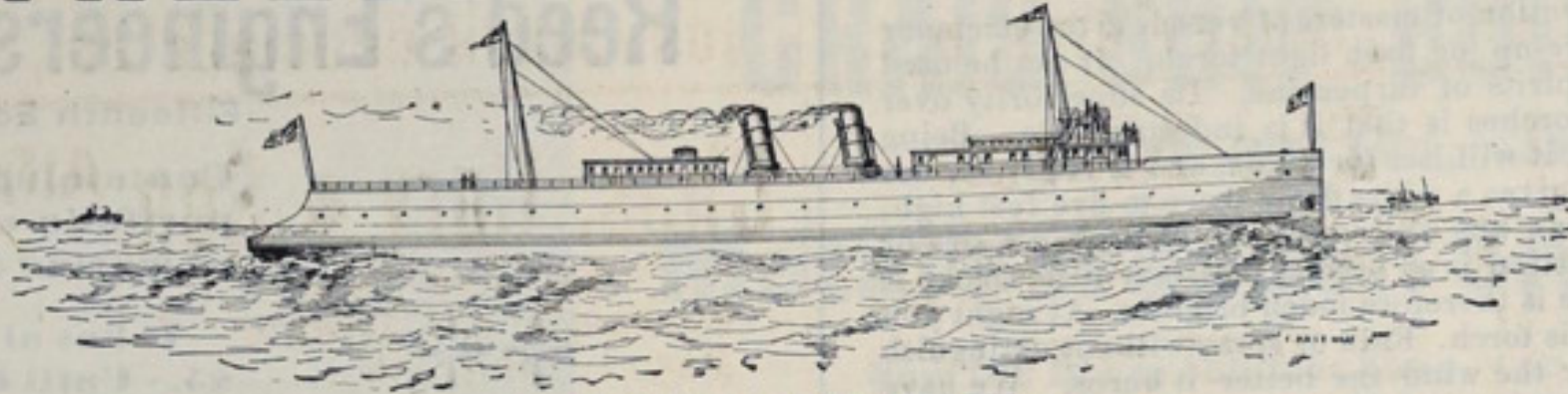


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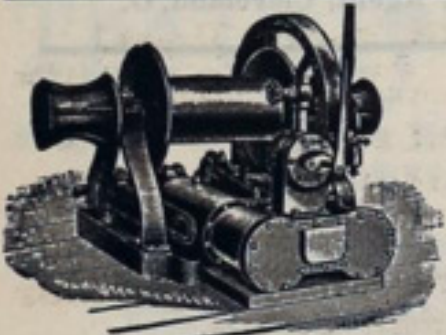
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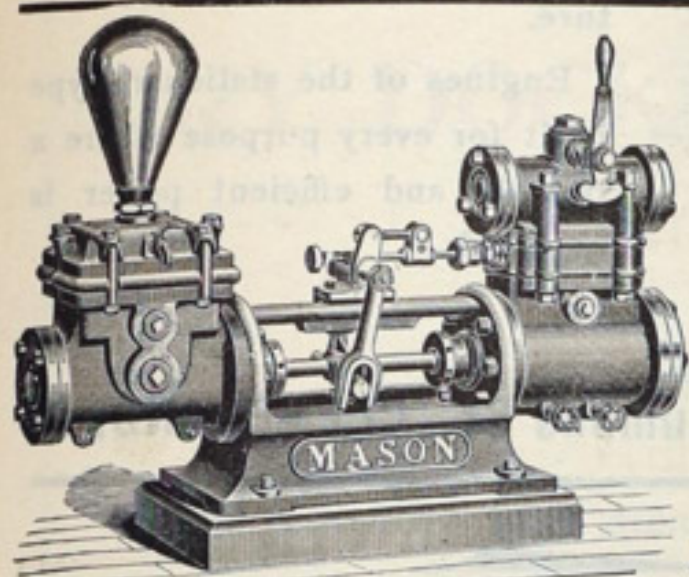
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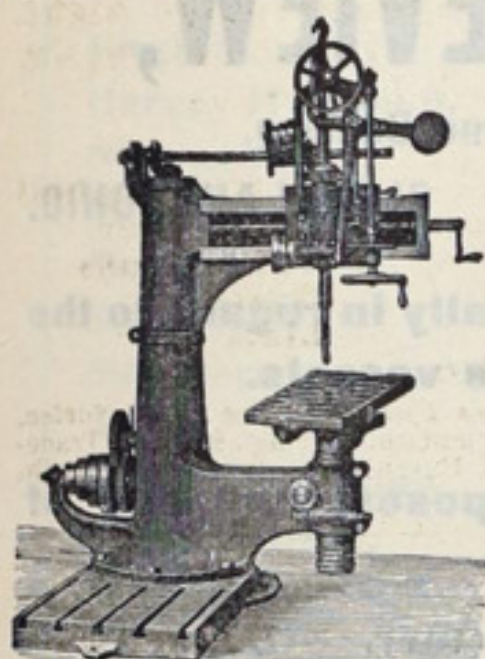
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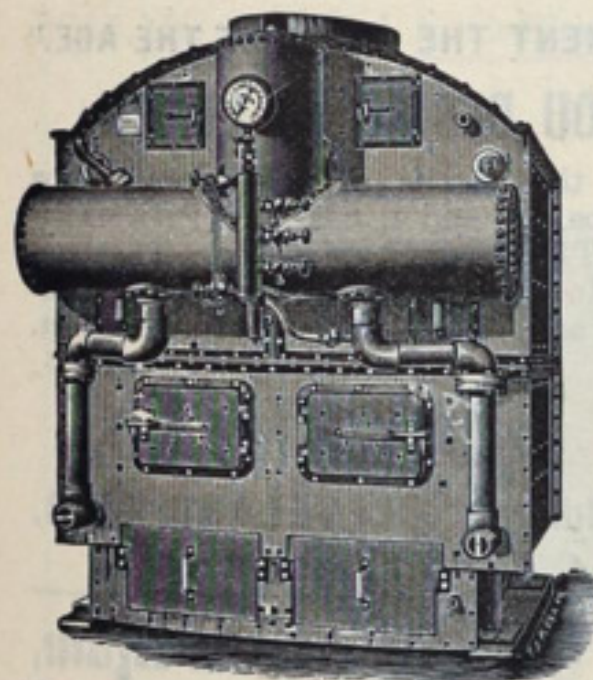
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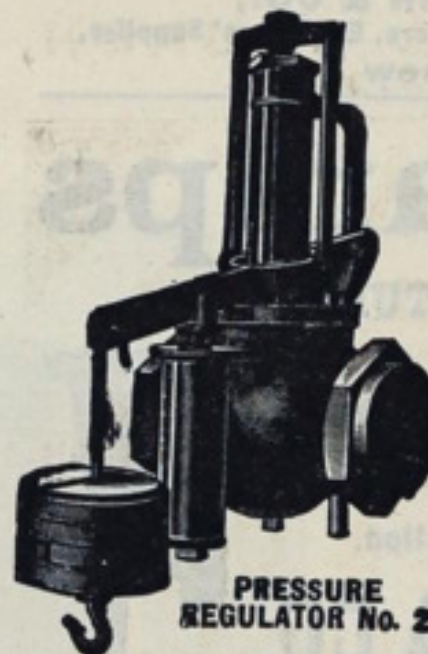
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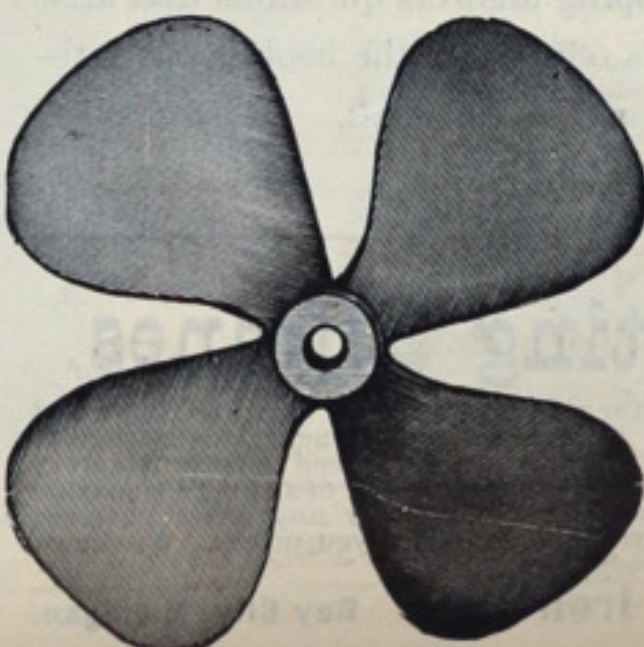
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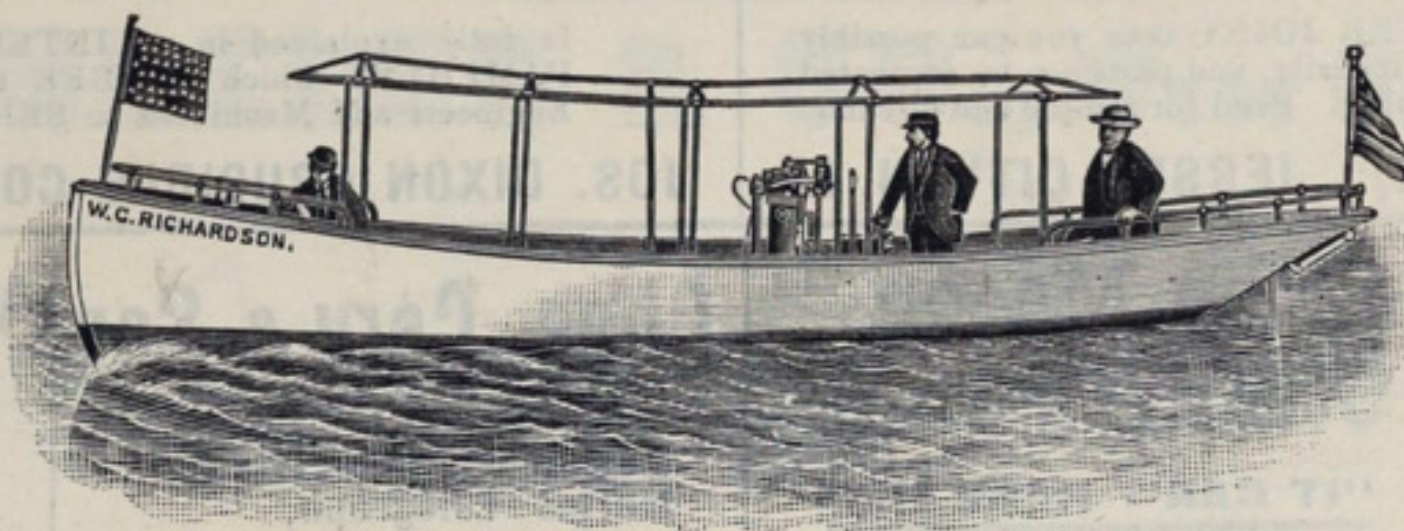


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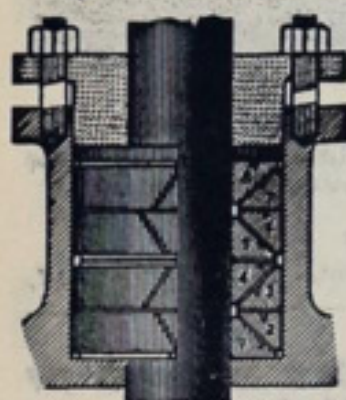
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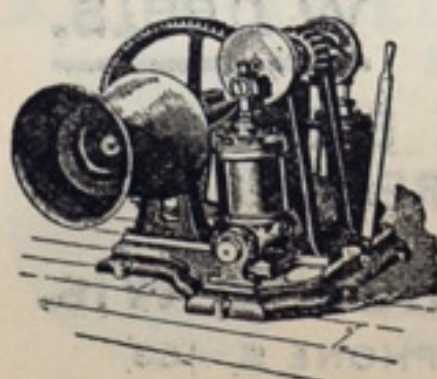
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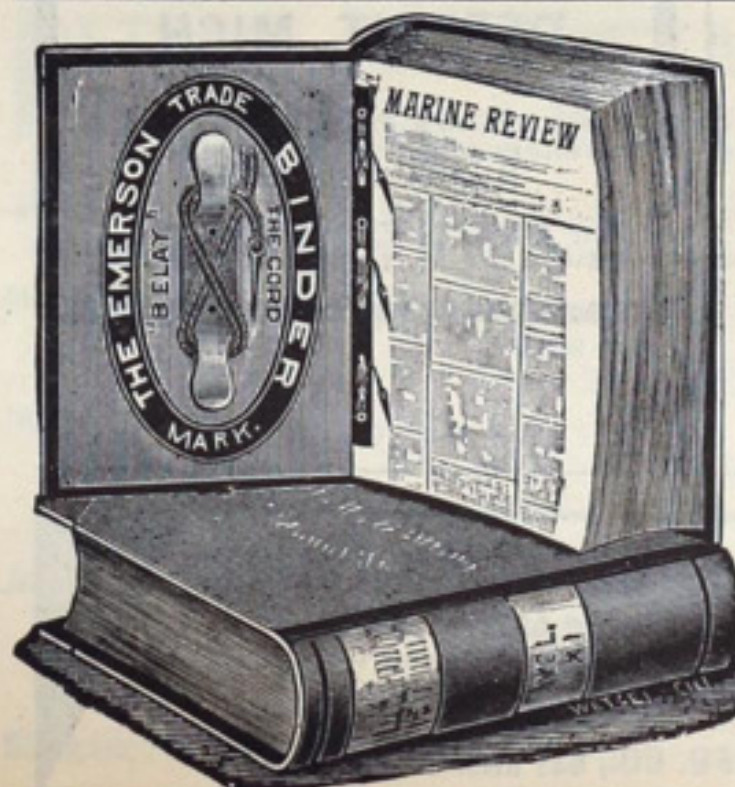
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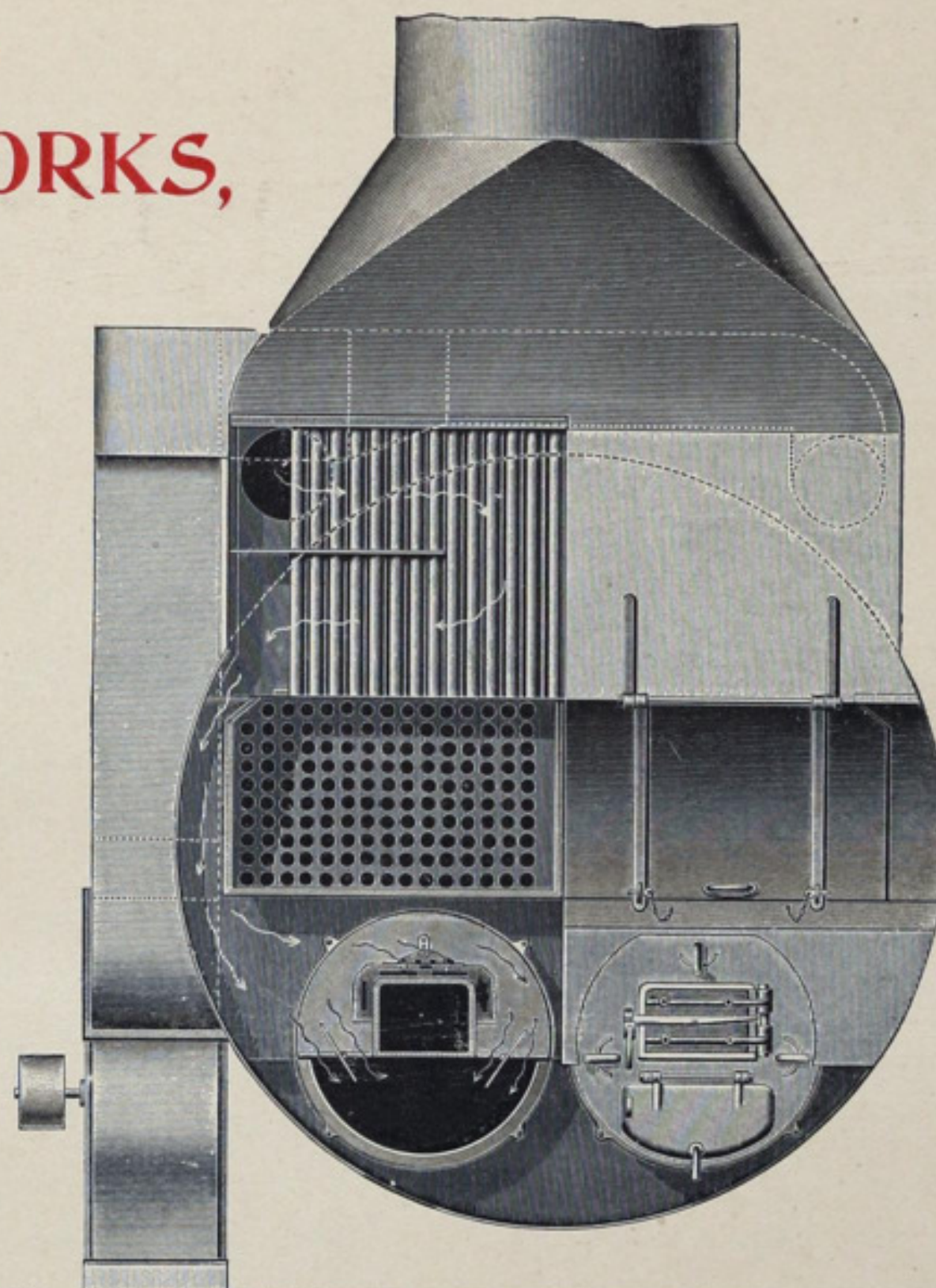
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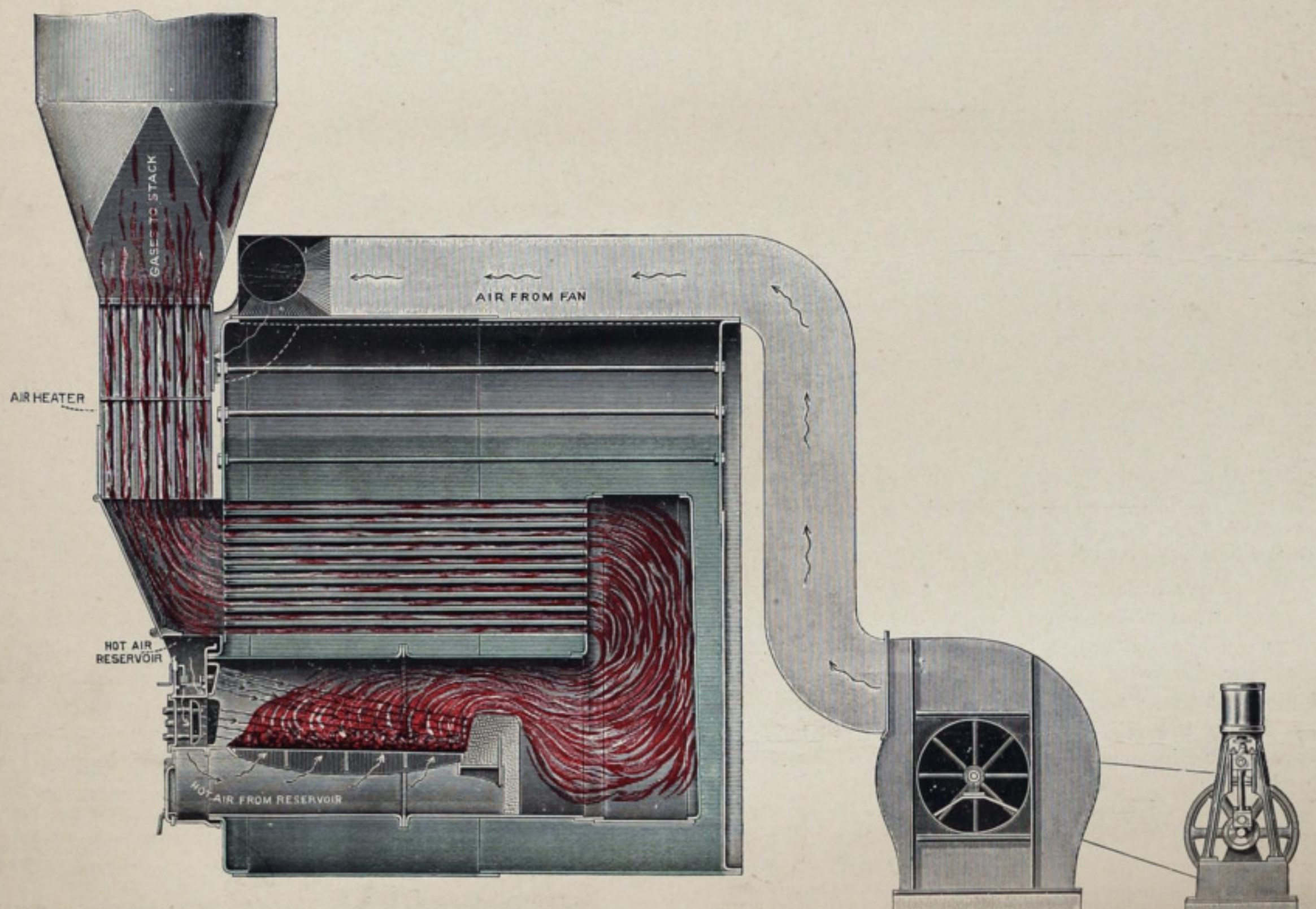
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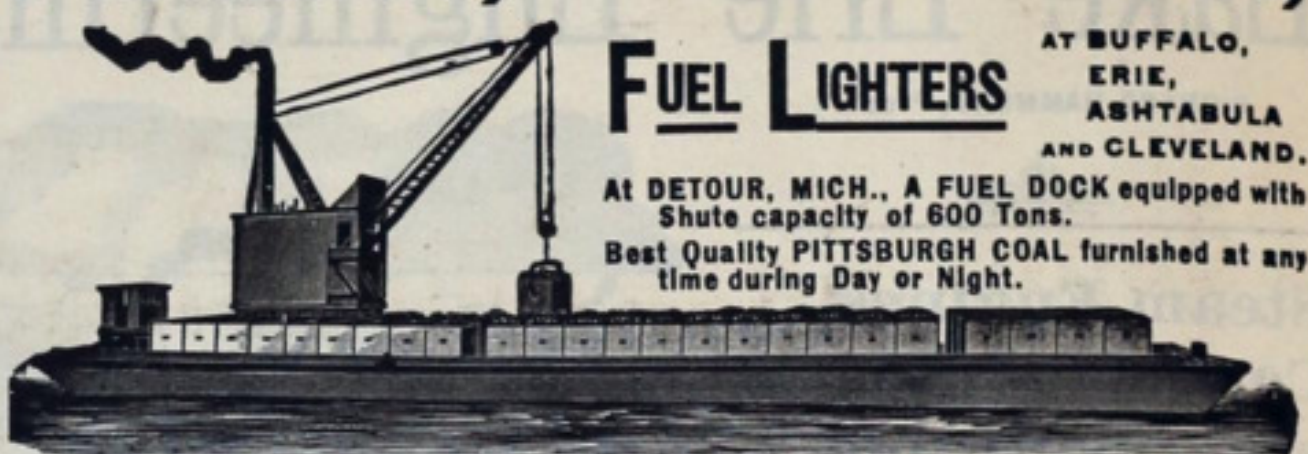
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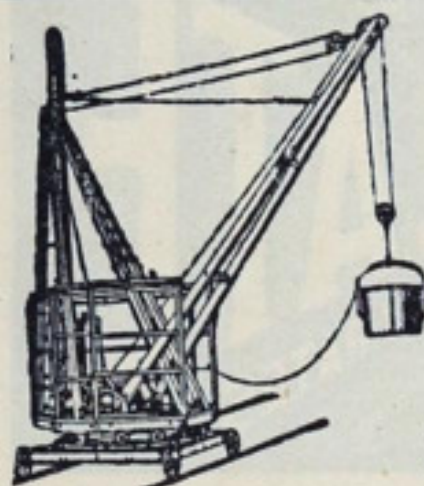
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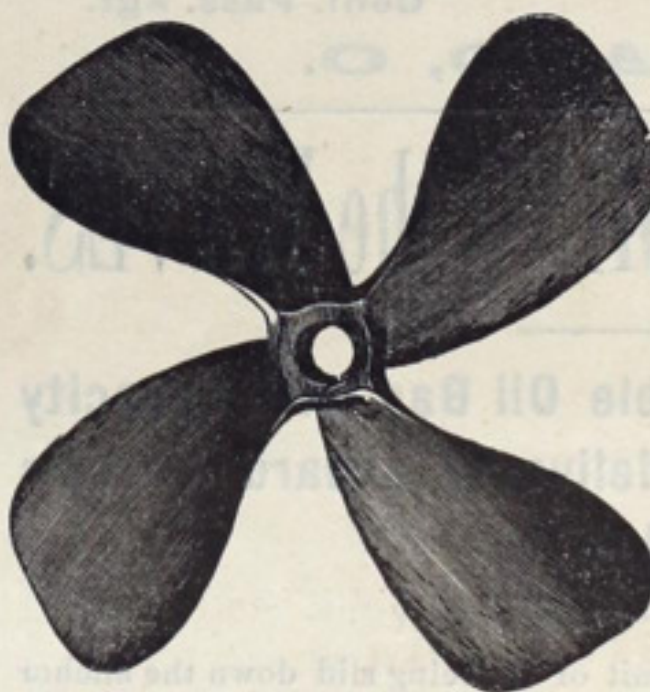
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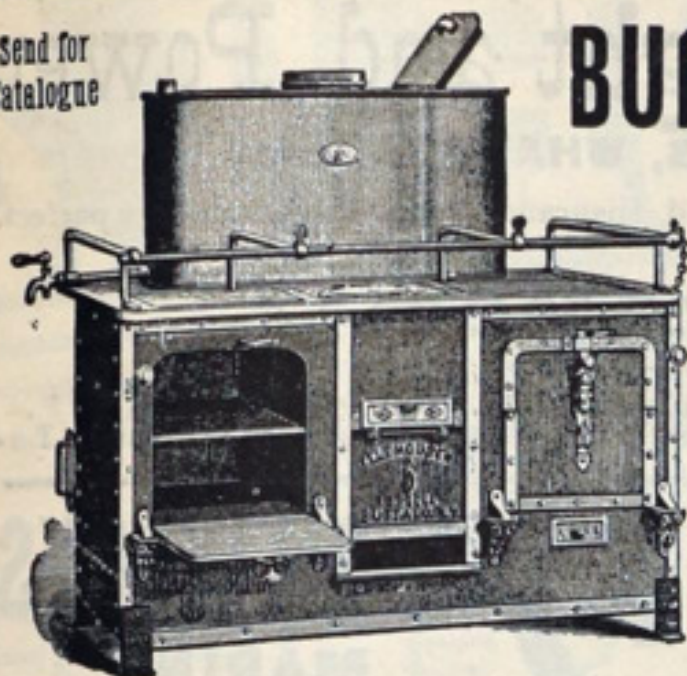
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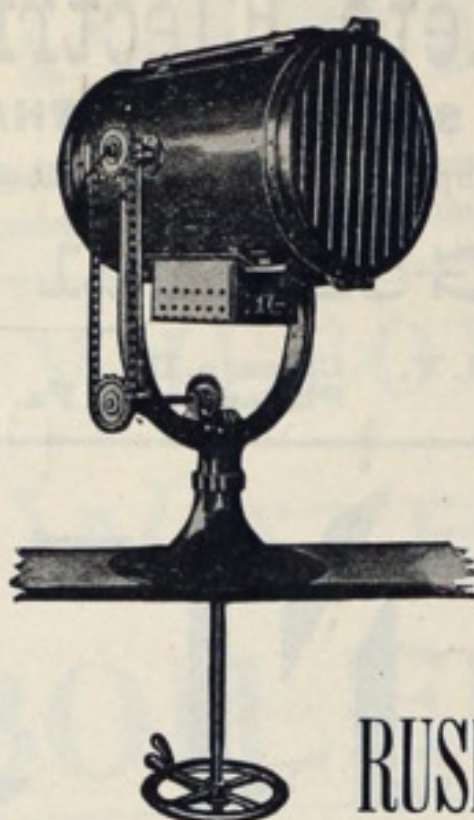
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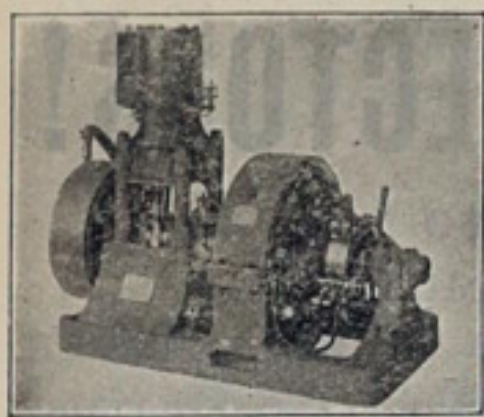
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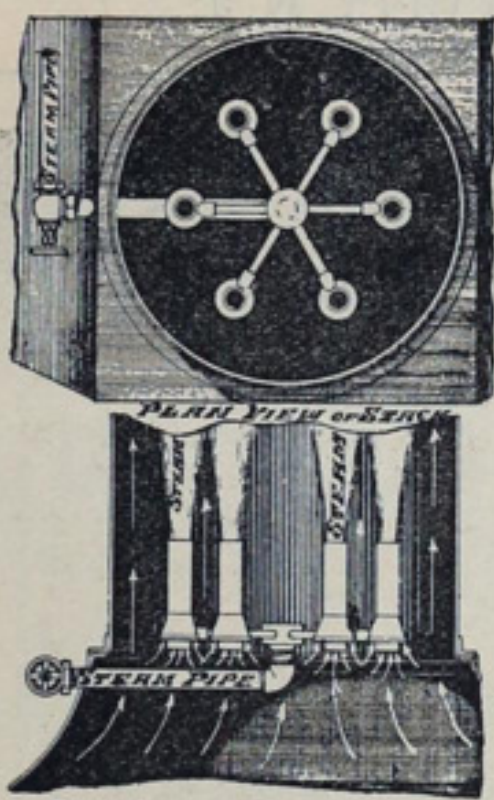
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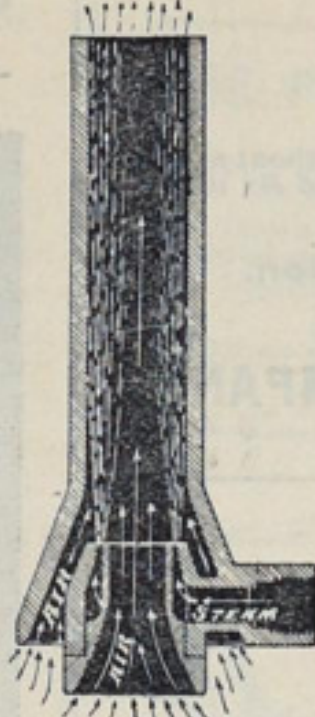
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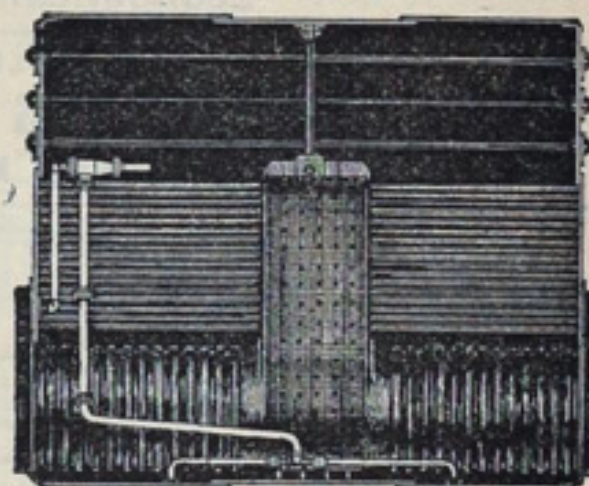
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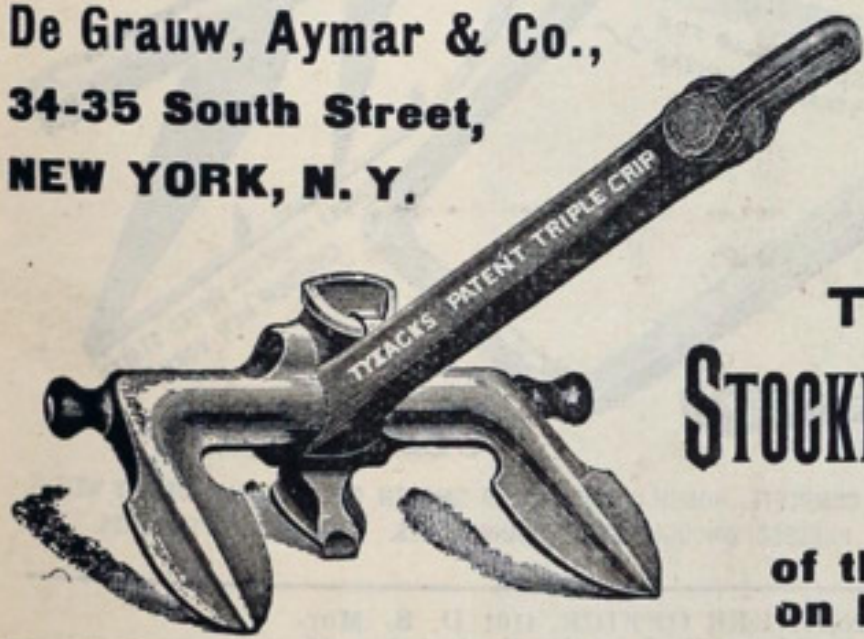
Mfrs. of Open Hearth and Bessemer Steel.

De Grauw, Aymar & Co.,  
34-35 South Street,  
NEW YORK, N. Y.

Sole Selling Agents  
in the  
United States  
for

TYZACK'S  
STOCKLESS ANCHORS

Over 40  
of these Anchors  
on Lake Vessels.

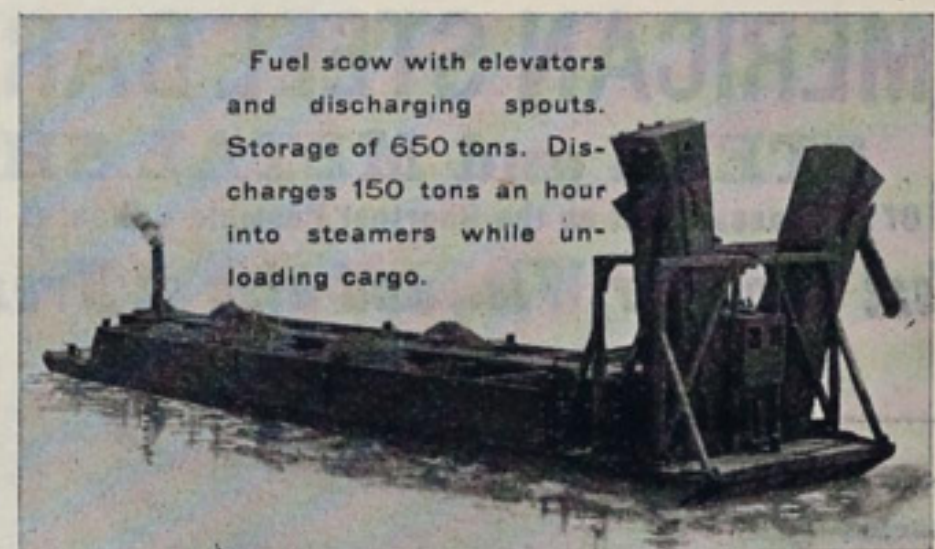


UNITED STATES ENGINEER OFFICE,  
Wilmington, N. C., Oct. 1, 1896. Sealed  
proposals for new, or secondhand, dredging  
plant, delivered at Wilmington, N. C., will be  
received here until 2 o'clock p. m. Nov. 2d, 1896,  
and then publicly opened. Information furnished  
on application to D. P. HEAP, Lieut.  
Col., Corps of Engrs, U. S. A. Oct. 24.

Steamboat Fuel at Ashtabula.  
Large Supplies of Best Quality.

Lighter

Carrying  
Different  
Grades  
at all  
Times.



Fuel scow with elevators  
and discharging spouts.  
Storage of 650 tons. Dis-  
charges 150 tons an hour  
into steamers while un-  
loading cargo.

M. A. HANNA & CO.,

Main Office, Perry-Payne Bldg., Cleveland.

Miners and Shippers.

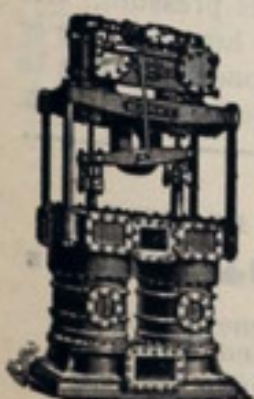
THE GEO. F. BLAKE MFG. CO.

BUILDERS OF

MARINE PUMPS

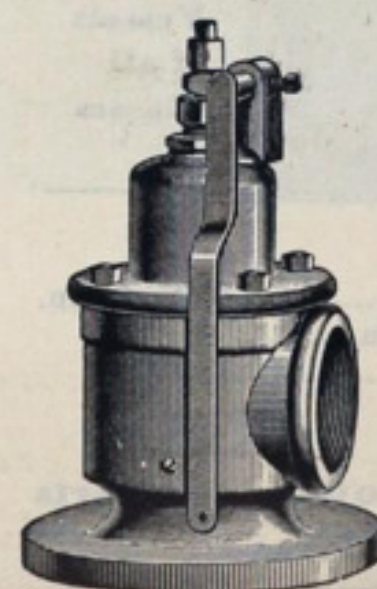
Single and Duplex Pumps for Boiler Feed,  
Fire or Bilge Service—Vertical and Horizontal.

Vertical and Horizontal Pumps, Air Pumps  
for Surface and Jet Condensers.



AIR PUMP ON  
U. S. CRUISER NEW YORK.

95 and 97 Liberty St., NEW YORK.



CROSBY STEAM GAGE  
AND VALVE CO.,

Sole Proprietors and Manufacturers of

Crosby Pop Safety Valves and Water Relief Valves Crosby Im-  
proved Steam Gages, Single Bell Chime Whistles, Patent  
Gage Testers, Victory Lubricators, and other specialties.

The Crosby Steam Engine Indicator, when required, is fur-  
nished with Sargent's Electrical Attachment, by which  
any number of diagrams can be taken simultaneously.

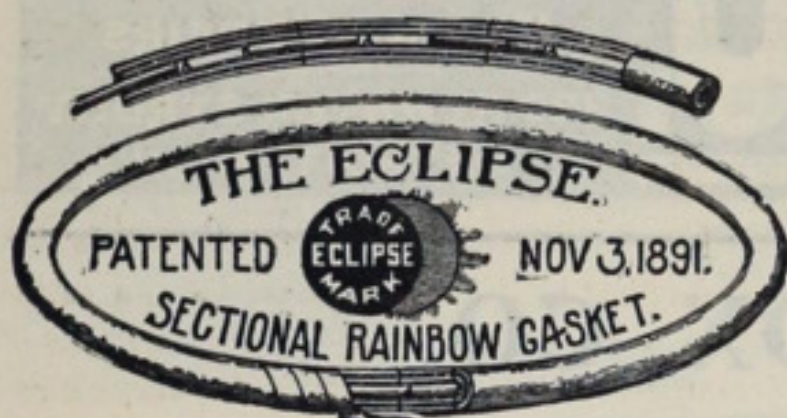
BRANDEN PUMP VALVES, rubber with wire-coil insertion.  
Manufacturers of all kinds of Pressure and Vacuum Gages,  
Water Gages, Gage Cocks, Radiator Cocks, and other  
Engine and Boiler Fittings and Supplies.

Branch Offices at New York, Chicago and London,  
Main Office and Works at BOSTON, MASS



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GASKETS MADE INSTANTLY WITH



In Boxes  
3 to 6  
Lbs. each.

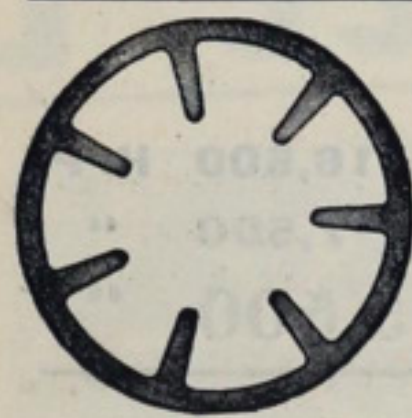
$\frac{3}{8}$  FOR UNIONS,  
 $\frac{1}{2}$  FOR HAND HOLES,  
 $\frac{5}{8}$  FOR MAN HOLES.

PATENTED AND MANUFACTURED  
EXCLUSIVELY BY

**PEERLESS RUBBER MFG. CO.,**

16 WARREN STREET, N.Y.

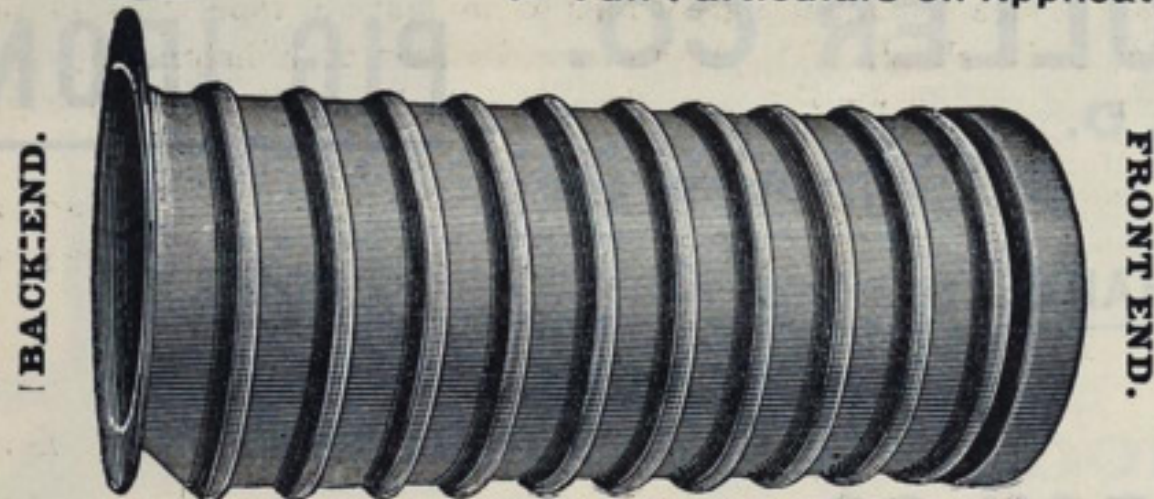
For Sale by the Leading Ship Chandlers and Supply Houses.



## Serve's Steel Ribbed Boiler and Stay Tubes

Show an average economy in fuel of 15 per cent. In steamers this means not only so much saving in cost of coal or increased power, but additional freight capacity.

Full Particulars on Application.



### PURVES' RIBBED STEEL BOILER FURNACE FLUE.

With this style of Furnace Flue the rivets at the "back ends" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any part of the boiler. No smithwork is required to fit it on a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of flue has been in use six years without a single complaint.

Over 14,000 of Purves' Ribbed Steel Furnace Flues in successful use in Marine Boilers.

Ellis & Eaves System of Induced or Suction Draft.

CHARLES W. WHITNEY, Sole Agent for the United States and Canada, 64, 66, 68 BROADWAY, NEW YORK

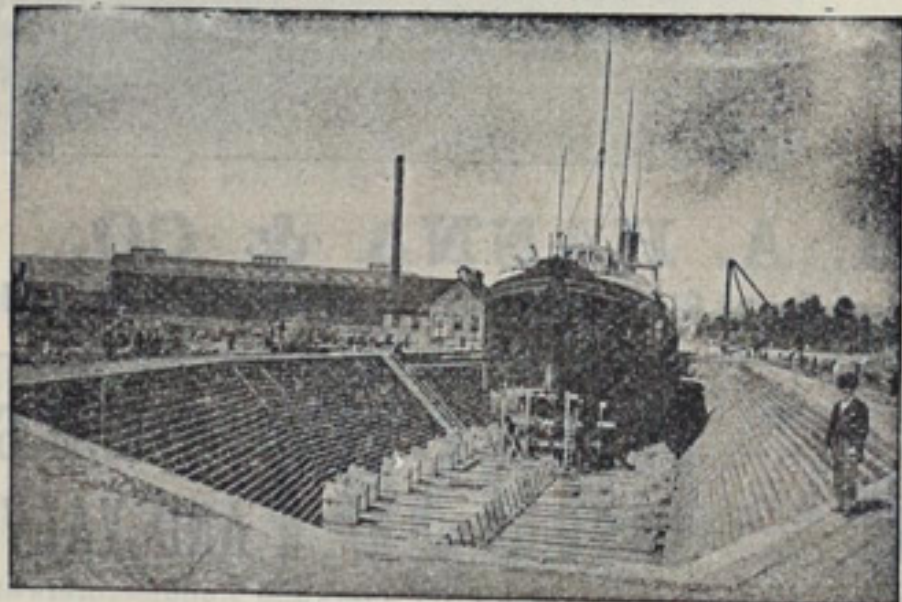
## AMERICAN STEEL BARGE CO. STEEL and METAL SHIPS

Of all classes built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.

Photograph of 300 ft. Boat in Dock.

Plates &  
Material  
Always  
on hand  
to Re-  
pair all  
kinds of  
Metal  
Ships in  
Shortest  
Time.



Best  
Quality  
of Oak  
instock  
for Re-  
pairing  
Wooden  
Vessels  
of all  
Classes

### SIZE OF DOCK.

Length, extreme.....537 feet.	Entrance, Top.....55 feet 9 in.
Breadth, Top.....90 " 4 in.	Entrance, Bottom.....50 "
Breadth, Bottom.....52 "	Depth over Sills.....18 "

### LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports  
**SUPERIOR, WIS.**

A number of Propeller Wheels in stock at Dry Dock.

## The Cleveland Dry Dock Co.

148 Elm St., Cleveland, O.

Telephone 1616.  
Resid. 'Phone 4080.

### REPAIRING A SPECIALTY.

Dimensions of Dock:

Lth. over all, 360 ft.  
Lth. on blocks, 340 ft.  
Width of gate, 50 ft.  
Depth over sill, 20 ft.

Capt. W. W. BROWN,  
Sec'y & Mgr.



Wm Chisholm in Dock.



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.  
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

U. S. ENGINEER OFFICE, 1101 D. S. Morgan Building, Buffalo, N. Y., October 15, 1896. Sealed proposals for 12,500 feet of Breakwater extension, and for Sand-Catch Pier extension at Buffalo, N. Y., under continuous contract will be received here until 11 A. M. November 30, 1896, and then opened. Specifications and information furnished on application. T. W. SYMONS, Major Engrs. Nov. 25.

## FOR SALE

TUG DUNCAN CITY. Length 112 feet, beam 19 feet, depth of hold 9 feet 3 inches; enclosed upper works and draws 10 feet. Steeple compound condensing engine, 18 and 36 by 26 inches. Built in 1891. Steel boiler, built in 1889, 15 feet long by 9 feet diameter. Tested for 150 pounds pressure. Has coal capacity for 145 tons; is well adapted for long and heavy towing or any kind of tug work; is a powerful boat and in prime condition. Can be seen at Cheboygan, Mich. Apply to Thompson Smith's Sons. Nov. 15.

## WM. WILFORD'S Matchless Water-Proof Canvas.

The best in the market for Hatch Covers, is stronger, lighter and more durable than any Water-Proof Goods yet produced. It is made of a twisted thread of pure flax which renders it very strong. It will not crack like Cotton Goods or take fire as easily, which is a great advantage, if soft coal is used.

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